



ONTARIO

MINISTRY OF THE ENVIRONMENT

**INVENTORY OF RESEARCH
1983 - 84 PROJECTS**

March 1984

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1984



**Ministry
of the
Environment**

The Honourable
Andrew S. Brandt
Minister

Brock A. Smith
Deputy Minister

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MINISTRY OF THE ENVIRONMENT

ONTARIO

INVENTORY OF RESEARCH

1983 - 84 PROJECTS

March 1984

POLICY & PLANNING BRANCH

RESEARCH COORDINATION OFFICE

**HAZARDOUS CONTAMINANTS
AND STANDARDS BRANCH**

135 ST. CLAIR AVENUE WEST
TORONTO, ONTARIO M4V 1P5

3/4/84

HAZARDOUS CONTAMINANTS
AND STANDARDS BRANCH
135 ST. CLAIR AVENUE WEST
TORONTO, ONTARIO M4V 1P5

MOE GOAL STATEMENT:

"To achieve and maintain a quality of the Environment--including air, water and land--that will protect human health and the ecosystem and will contribute to the well-being of the people of Ontario."

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PREFACE

The Inventory of Research Projects is coordinated by the Research Coordination Office, Policy and Planning Branch, for the benefit of the Ministry of the Environment's Research Advisory Committee. The information presented in this report would be of value to MOE and other provincial, federal, and municipal staff as well as to researchers in universities, research institutions, and private consultant firms. Questions concerning specific projects may be addressed to the Director of the Branch responsible for the study or to the Research Coordination Office.

INTRODUCTION AND EXPLANATION

Origin

The Ministry of the Environment first published an Inventory of Research and Development projects in June, 1973. The publication was initiated by the Deputy Minister who recognized the need for a comprehensive list of research and development projects which would be readily available. The initial Inventory was prepared by the Strategic Planning Branch. The Research Advisory Committee was appointed in 1975 and is now responsible for the preparation of this Inventory, with support from the Research Coordination Office, Policy and Planning Branch.

Purpose

The purpose of the Inventory is to promote the communication of the Ministry of the Environment's activities to the research community and to facilitate a more efficient use of capital and human resources devoted to environmental research. It is hoped that the information contained here will assist those currently conducting studies by providing them with access to projects in this Ministry which are related to their own. Another major objective is to foster cooperative efforts and prevent the duplication of programs, particularly among Ministries of the Ontario Government. Ultimately, the Inventory will provide a comprehensive background for the review of environmental research priorities, revealing those areas which are already being extensively examined and those which demand increased attention.

Organization of the Inventory

This Inventory consists of profiles of individual research projects being conducted by or for Ministry Branches and Regions in 1983-84. It includes in-house research activities as well as research generated through grants and contracts to universities, research institutions and environmental consulting firms. The funds used for this program originate in the Ministry Regular Budget and from Provincial Lottery Dedications to environmental health research.

Since the preparation of this year's Inventory coincides with the implementation of the MOE new Research Planning Process, projects were classified in three matrix-oriented groups of projects, one group for analytical method development, and a group for Pesticides Research. It is felt that this classification would better match the terms of reference of the Research Working Groups responsible for the planning of:

- A. Air Pollution Research,
- B. Water Pollution Research,
- C. Liquid and Solid Waste Research,
- D. Analytical Method Development,

in addition to the activities of the Pesticides Advisory Committee in the Ministry.

The reader should be aware that this report summarizes the research activities in 1983-84, i.e. it is historical from the point of view of project approval, implementation, and the availability of some or all the anticipated results. The reader should also be advised to expect a Research Planning Report which would provide predictive short and long-term research needs of the Ministry.

FORMAT OF FY 83-84 INVENTORY

The projects are grouped under their classification. The profiles present the following information:

<u>Branch</u>	Ministry branch responsible for the project and who should be contacted for further information.
<u>Project Title</u>	For identification and filing.
<u>Key Words</u>	Key words relating to each project are listed alphabetically in the Index at the back of the Inventory.
<u>Principal Investigator</u>	Contact source for additional information on project.
<u>Liaison Officer or Supervisor</u>	Shows the Ministry of the Environment personnel responsible for the project.
<u>Research Category</u>	Identifies whether work is done in Ministry (internal) or outside (grant or a solicited or unsolicited contract) and if project is multi-year.
<u>Objective</u>	Immediate reasons for undertaking the project.
<u>Description</u>	Details of the projects focus on the methodology employed and indicate the nature of the research to persons with expertise in the field.
<u>Duration of Project in Years</u>	Starting and completion dates.
<u>Budget</u>	Current year total dollars and man years for the project. These are estimates made prior to start of the project.
<u>Source of Funds</u>	Internal research projects conducted by Ministry staff doing regular work are funded out of normal branch budgets. Some special projects use funds set up particularly for the project and are identifiable in MOE budget. MOE encourages cooperation and participation of other Ontario Ministries, Federal departments and local governments in joint research activities. Funding of these cooperative efforts is shared between involved partners including the utilization of research results and technologies.
<u>Reporting</u>	Tentative dates of interim and final reports.

<u>Participation by Others</u>	This space indicates if the project is assisted from other government organizations by either funding, equipment or staff support.
<u>Remarks</u>	Special comments on the project not listed above are shown here.

RESEARCH ADVISORY COMMITTEE

The Research Advisory Committee (RAC) was created in 1975 to provide a broadly based coordinating and planning group for the Ministry's research program. The committee was made up of representatives of the various Ministry Branches who have research responsibilities plus a member from the Policy & Planning Branch, a representative from the Regional Offices and a medical advisor from the Ministry of Labour.

The Research Advisory Committee was also responsible for the administration of the Provincial Lottery Trust Fund dedicated to health-oriented environmental projects.

POLICY AND PLANNING BRANCH

Following the reorganization of MOE in 1982, the responsibility for coordinating the Ministry's external research activities was assigned to the Policy & Planning Branch. The role of the Branch in the research area was described as to ensure coordination and the setting of priorities so as to utilize the Ministry's limited resources in the most effective manner by:

1. Coordinating the identification of the Ministry's research needs and evaluating those needs,
2. Monitoring external research performance and encouraging the application of research results to the solution of environmental problems.

To effectively implement these requirements, a new Research Coordination Office was established in the Policy & Planning Branch with responsibilities to:

- chair and provide support services for the Research Advisory Committee,
- administer the Provincial Lottery Grants program and other environmental research grants programs,
- develop Ministry research strategies and policies,

- monitor research performance,
- encourage the application of research results to the solution of environmental problems,
- develop improved management processes related to research activities with consideration given to MOE resources.

RESEARCH PLANNING PROCESS

In 1983, the Policy & Planning Branch developed and obtained approval of the Ministry's Research Planning Process which conformed with the Ministry's Corporate Strategic Plan to:

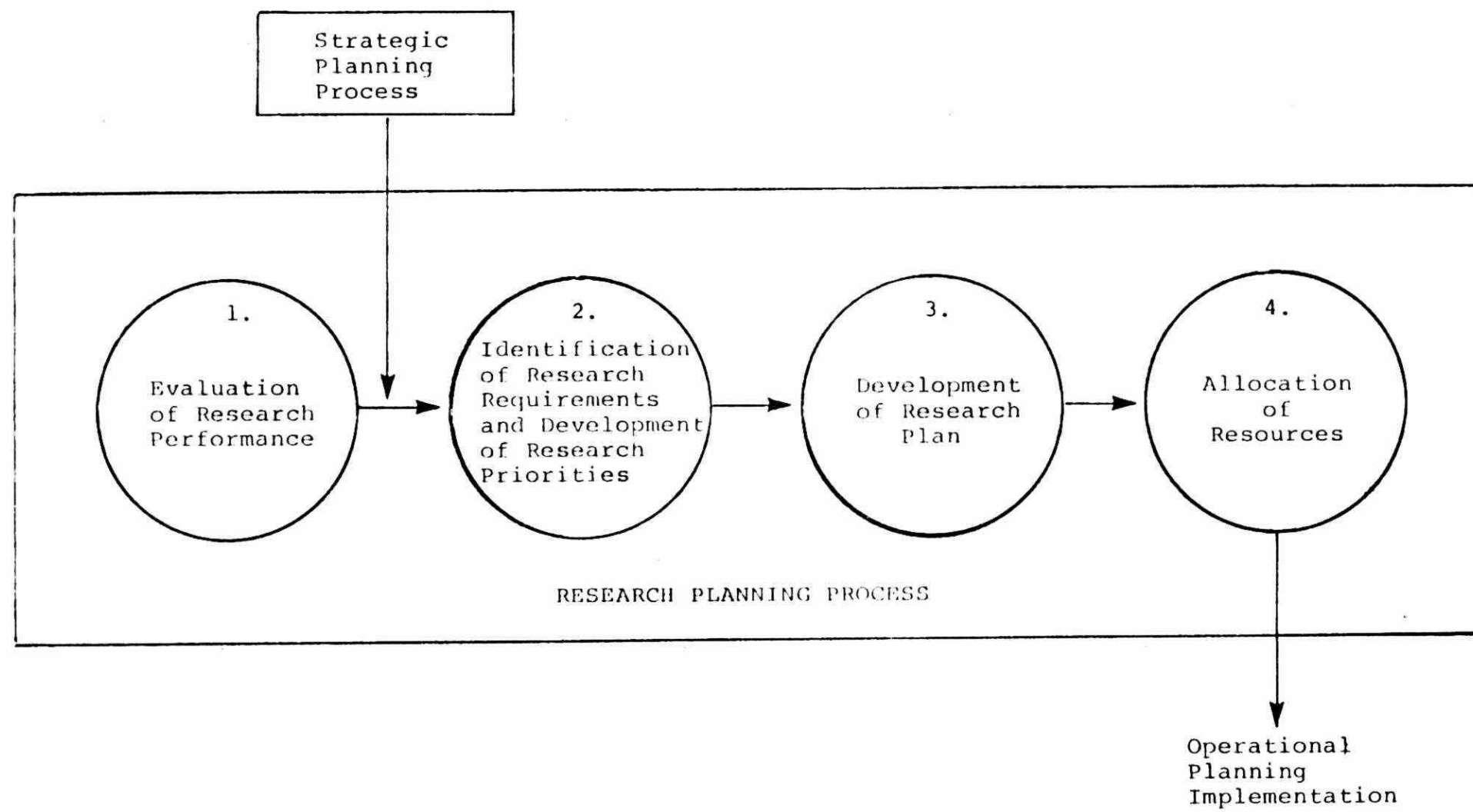
- ensure that research is consistent with Ministry goals and objectives,
- allow Branches and Regions to identify research requirements and priorities and develop research programs,
- coordinate multi-branch research programs,
- allocate resources based on established Ministry priorities,
- distribute research results and recommendations,
- evaluate research performance.

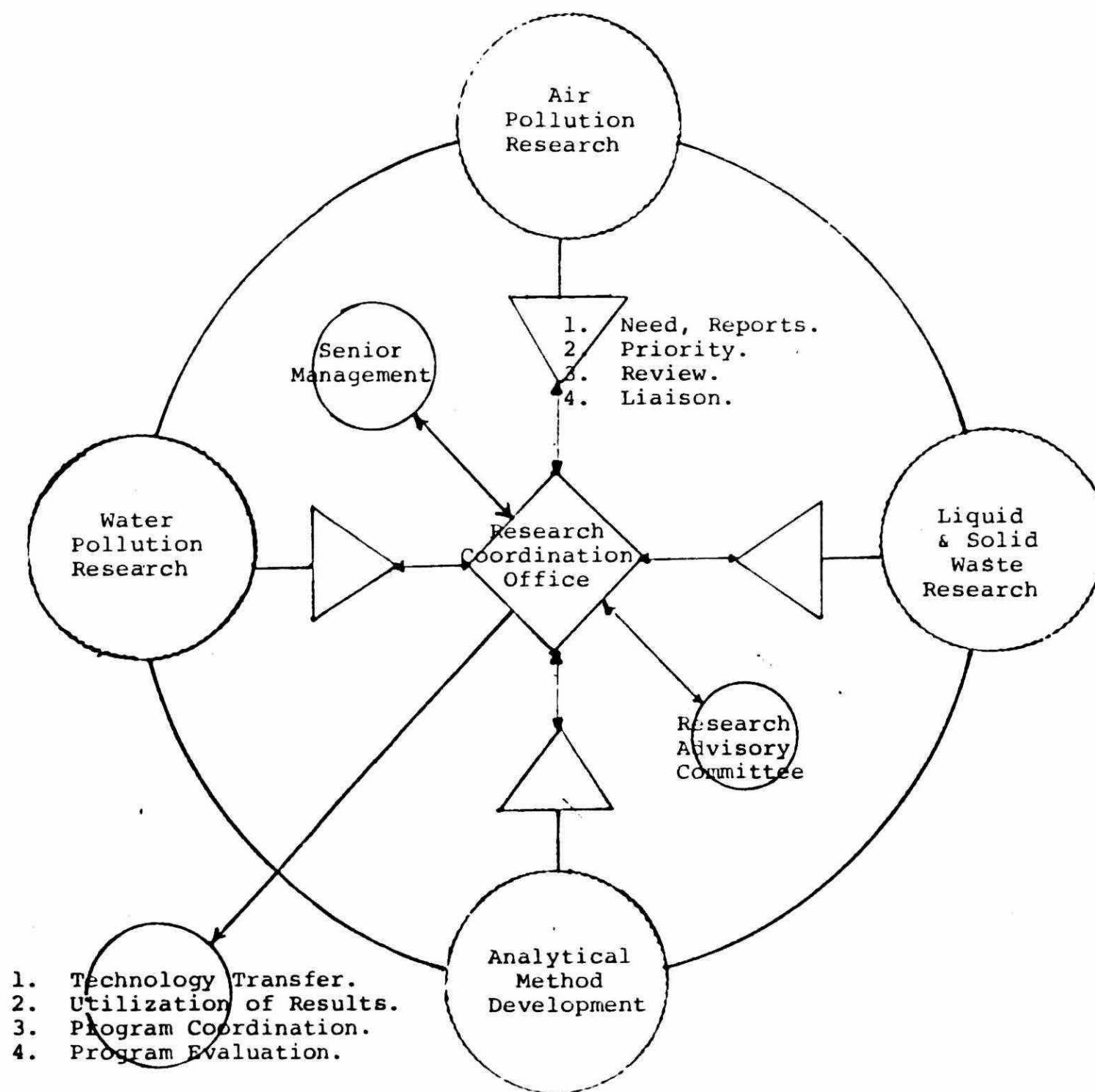
The Ministry's research program comprises:

- (a) internal research projects conducted by appropriate Branches or Regions with in-house resources,
- (b) external research projects conducted by universities and consultants supported by grants or contracts.

The Research Planning Process, which applies to internal and external research, follows a 12 month cycle commencing in April with the preparation of a Performance Evaluation Report and terminating in March with the distribution of an approved Ministry Research Plan.

STEP 1.





I. AIR POLLUTION RESEARCH



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"ASSESSMENT OF HUMAN EXPOSURE TO AIR POLLUTION."

KEY WORDS: Air Pollution, Human Exposure, Indoor-Outdoor Pollution, Personal Monitors

PRINCIPLE INVESTIGATOR Frances Silverman, Ph.D, Sheldon Mintz, M.D., The Gage Research
AND AFFILIATION Institute, Department of Medicine, University of Toronto.

LIAISON OFFICER Denis Corr
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

1. To calibrate and validate personal, indoor and outdoor monitors to assess human exposure to air pollution (particulates, sulphur dioxide and nitrogen dioxide).
2. To use these monitors in the field to assess human exposure to particulates, SO₂ and NO₂.
3. To provide data from these studies on the relationships between these modes of measuring exposure to air pollution and assess which gives the most realistic estimate of exposure.

DESCRIPTION:

Studies of health effects of air pollution are critically dependent upon quantitation of amount of pollutant exposure. Unfortunately, there are major differences between air pollution levels measured at fixed air pollution monitoring stations, and inside and outside buildings at a distance from these stations; persons going about their activities encounter yet different amounts of pollutants. To investigate these relationships, a small portable monitor has been developed which (with minor design changes) can measure SO₂, NO₂, and particulates in all of these circumstances. A study of the health effects of these pollutants on 90 asthmatics and non-asthmatics will be undertaken.

An awareness of the relationships between personal and fixed station air pollution levels will allow rational air pollutant quality control criteria to be formulated. Furthermore, the use of personal monitors may allow identification of significant sources of air pollution within the home, a factor which is important in air pollution abatement programs.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:		TOTAL DOLLARS		MAN YEARS	
	\$161,000	TOTAL PROJECT	CURRENT YEAR \$61,500	TOTAL PROJECT	CURRENT YEAR None from MOE
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY <input checked="" type="checkbox"/> FUNDED <input type="checkbox"/> PROJECT	OTHER <input checked="" type="checkbox"/>	

IS A REPORT ANTICIPATED?

Yes. Progress reports and publication available.*

PARTICIPATION BY OTHER MINISTRIES: Provincial Lottery Trust Fund pays 35.5% (\$61,735) of the total cost of this project which is \$173,470. The other partners paying 64.5% of the total cost is Health & Welfare Canada.

REMARKS:

This project was bridge funded with Lottery Funds between October 1, 1979 and March 31, 1980. Support for the project was renewed for an additional two years between June 1, 1980 and May 31, 1982.

*Please refer to Technology Transfer Conference No. 4 (1983).



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47 PL

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"INVESTIGATION OF SLEEP DISTURBANCE EFFECTS OF ROAD TRAFFIC NOISE."

KEY WORDS: Noise, Sleep Disturbance, Traffic Noise, Road Traffic Noise

PRINCIPLE INVESTIGATOR AND AFFILIATION S. S. Wilson, S. S. Wilson & Associates, 177 Finch Avenue West
Suite 23, Downsview, Ontario M3J 2E9

LIAISON OFFICER OR SUPERVISOR J. Manuel, Waste Management Branch

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT X MULTI-YEAR PROJECT X
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE:

- the determination of relationship between road traffic noise levels and sleep disturbance with a view to providing recommended road traffic noise level limits in relation to perceived health effects.

DESCRIPTION:

The study will entail a program of objective measurements of sleep disturbance by road traffic noise coupled with a literature review on human response to noise. The data will be assessed for correlation.

Noise level limits will be recommended for indoor living environments based upon possible health impairment effects due to sleep disturbance.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$153,000	\$23,900	None from MOE		
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER <u>X</u>	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

The study will provide recommended outdoor noise level limits for living areas in residences to be built in new developments adjacent to sources of traffic noise.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: June 1982

PROJECT TITLE: "CONTROLLING SULPHUR DIOXIDE EMISSIONS."

KEY WORDS: Air Pollution Costs, Sulphur Dioxide Emissions, Stack Emissions.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. A. P. Grima
University of Toronto

LIAISON OFFICER OR SUPERVISOR C. Griffith

RESEARCH CATEGORY: INTERNAL GRANT —
UNSOLICITED CONTRACT — SOLICITED CONTRACT —
MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

To examine the economics of SO₂ emission controls in Sarnia-Nanticoke Industrial Complexes: alternative enforcement policies will also be examined. Final selection of the case study area will depend upon data availability for empirical analysis.

DESCRIPTION:

The research would be completed in 3 phases. Phase 1 would involve reviewing the technological options for SO₂ control within fossil-fueled generating stations, petroleum refining and the steel industry in terms of SO₂ removal efficiency and associated costs. In the second phase, we would use the cost estimates from phase 1 to construct incremental or marginal cost-of-abatement curves. These curves, unlike average cost figures, will show the increment which occurs in total cost when an additional unit of control is exercised. Finally, having estimated the economic consequences of complying to SO₂ regulations, the cost-of-abatement of alternative SO₂ enforcement policies would be examined.

It is expected that the cost of pollution control for SO₂ treatment will rise as the level of emission is decreased. Further, it is anticipated that comparisons among alternative pollution control enforcement policies will show that regulatory systems by themselves may not always be the most cost-effective policy instrument.

DURATION OF PROJECT	1 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$30,000	-	None	None	
SOURCE OF FUNDS:	PROVINCIAL Lottery Trust Funds	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	No				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "MONITORING GENOTOXICITY IN THE ATMOSPHERE USING SISTER CHROMATID EXCHANGE IN MICE."

KEY WORDS: Genotoxicity, Air Pollution monitoring.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. M. Petras, Department of Biology
University of Windsor

LIAISON OFFICER OR SUPERVISOR Dr. M. Salamone

RESEARCH CATEGORY: External INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a straightforward procedure for ongoing monitoring of the atmosphere for agents genotoxic to a mammalian system.

DESCRIPTION:

Field mice are used as monitor-indicators of outdoor air pollution, and in vivo sister chromatid exchange assay will be used to measure genotoxic damage. Data will be compared to control animals.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	1985
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$61,800	\$32,400			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	Regular Research	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes.				
PARTICIPATION BY OTHER MINISTRIES:	None.				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"A MASS SPECTROMETRIC STUDY OF SELECTED AIR POLLUTANTS."

KEY WORDS: Mass Spectrometry, Organic Air Contaminants, Analytical Methods,
Instrumental Methods of Analysis.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. R. March, Department of Chemistry
Trent University.

LIAISON OFFICER OR SUPERVISOR Ms G. Foster.

RESEARCH CATEGORY: External INTERNAL GRANT X UNSOLICITED CONTRACT SOLICITED CONTRACT MULTI-YEAR PROJECT CONCURRENT PROJECT

OBJECTIVE:

To investigate the reaction mechanism and specific reaction rates of 9
Polyaromatic Hydrocarbons including their oxidation reactions.

DESCRIPTION:

DURATION OF PROJECT	<u> 2 </u> YEARS	PRESENT YEAR IS	<u> 2nd </u> YEAR	REPORTING DATE	<u>November 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$43,600	\$22,000			
SOURCE OF FUNDS:	REGULAR WORK <u> </u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u> </u> PROJECT	OTHER <u> </u>	

IS A REPORT ANTICIPATED?

Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"MODIFICATIONS TO CHEMILUMINESCENT INSTRUMENTS OF NO AND NO₂ FROM AN AIRCRAFT AND A MOBILE LABORATORY."

KEY WORDS:

Chemiluminescence, Nitrogen Oxide Monitoring, Mobile Air Monitoring

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. H. Schiff, Department of Chemistry
York University

LIAISON OFFICER
OR SUPERVISOR

Dr. M. Lusic

RESEARCH

CATEGORY: External

INTERNAL
GRANT X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

- To modify existing chemiluminescent nitrogen oxide detectors for use to measure NO and NO₂ in tropospheric air from aircraft and from a mobile laboratory.

DESCRIPTION:

The modified instrument will be used by the Ministry for testing urban plume and for transporting models at high sensitivity. The developed technology will be transferred to MOE by converting one of its instruments for such measurements.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

1984

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$22,200

\$22,200

SOURCE OF
FUNDS:

REGULAR
WORK
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED
PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"SURVEY OF BLOOD LEAD LEVELS IN SCHOOL CHILDREN."

KEY WORDS: Blood Lead, Lead Survey

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Contractor to be selected.

LIAISON OFFICER
OR SUPERVISOR

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT X

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

- To determine blood lead levels of Ontario school children.

DESCRIPTION:

Studies of blood lead levels in Ontario children (the group at greatest risk) have been carried out primarily in Toronto. It is proposed to measure blood lead levels of school children in other Ontario communities with known above average ambient air lead concentrations.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1985</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$75,000	\$25,000			
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
		Provincial Lottery			
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	MOL, MOH				

REMARKS:

Total cost equally covered by MOE, MOL and MOH.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"DEVELOPMENT OF A MEASUREMENT METHOD FOR NICKEL CARBONYL."

KEY WORDS: Nickel Carbonyl, Air Pollution

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Contractor to be selected.

LIAISON OFFICER
OR SUPERVISOR

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

- Develop a method of measurement for nickel carbonyl for ambient air.

DESCRIPTION:

At the present time, the Ministry has an ambient air criterion for nickel carbonyl of $0.5 \mu\text{g}/\text{m}^3$ (24 hr. avg.) and a point of impingement standard of $1.5 \mu\text{g}/\text{m}^3$ ($\frac{1}{2}$ hr. avg.). However, there are no currently available field methods of measurement for ambient air concentrations in this range.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

1985

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR

MAN YEARS
TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY
FUNDING Regular
Research

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "TO INVESTIGATE THE 'SHORT-TERM TEST' MUTAGENICITY AND CHEMICAL COMPOSITION OF BENZENE EXTRACTABLE FRACTION OF COKE OVEN EMISSIONS."

KEY WORDS: PAH, Coke Oven Emission,
Mutagenicity of PAH.

PRINCIPLE INVESTIGATOR
AND AFFILIATION Contractor to be selected.

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: External INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE:

- to establish a scientific base for setting standards or guidelines of PAH in air.

DESCRIPTION:

Study coke oven emissions, compare benzene and possibly other solvent extractable fraction, mutagenicity test results and chemical analysis of air particulates. Potential correlation between short-term mutagenicity test results, benzene extractable fractions, and human health effect from coke oven emission will be investigated.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1986</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ———	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE:

Production of ozone insensitive field bean varieties

KEY WORDS:

Phytotoxicology, ozone, beans

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Profs. W.D. Beversdorf & B.D. McKersie, University of Guelph

LIAISON OFFICER
OR SUPERVISOR

R. Pearson

RESEARCH
CATEGORY:

INTERNAL GRANT X

UNSOLICITED CONTRACT MULTI-YEAR PROJECT
SOLICITED CONTRACT CONCURRENT PROJECT

OBJECTIVE:

To generate basic plant population for ozone resistant white beans.

DESCRIPTION:

The ozone tolerance of specific bean populations will be measured and the capability for transferring tolerance characteristics to Ontario field beans will be investigated.

DURATION
OF PROJECT

4 YEARS

PRESENT
YEAR IS

4th YEAR

REPORTING
DATE

Annual

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

54,770

15,478

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

4

1

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED
PROJECT

OTHER

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Completion of the development of a strategy for predicting the impact of fast food restaurants on the surrounding community

KEY WORDS: Odour

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor A.W. Gnyp, University of Windsor

LIAISON OFFICER
OR SUPERVISOR E. T. Barrow, P.K. Misra

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a strategy for predicting the impact of odourous pollutants from the fast food restaurants.

DESCRIPTION:

Ambient and source sampling techniques will be developed and correlated with complaint potential thresholds.

DURATION OF PROJECT: 3 YEARS PRESENT YEAR IS 3rd YEAR REPORTING DATE: Annual

BUDGET: TOTAL DOLLARS TOTAL PROJECT 21,400 CURRENT YEAR 7,350 MAN YEARS TOTAL PROJECT 3 CURRENT YEAR 1

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Ozone-early blight interaction of potato: implication and disease control.

KEY WORDS: Phytotoxicology, ozone, potato

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor G. Hofstra, University of Guelph

LIAISON OFFICER
OR SUPERVISOR R. Pearson

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To increase potato yield by improving understanding of ozone damage.

DESCRIPTION:

Ozone injury to different potato cultivars will be assessed and this will be related to early blight and yield loss. Effectiveness of chemical protectants will also be studied.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>4th</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	82,218	17,500	4	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?					
YES					
PARTICIPATION BY OTHER MINISTRIES:					
NO					
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Sweet corn and green and wax bean response to air pollution in Southern Ontario

KEY WORDS: Phytotoxicology, ozone

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor D. Ormrod, University of Guelph

LIAISON OFFICER
OR SUPERVISOR R. Pearson

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To determine optimum protection strategy against ozone for sweet corn and green bean crops.

DESCRIPTION: The effect of ozone, chemical protectants, location and cultivar type will be measured and correlated with yield and visible leaf injury for sweet corn and green bean crops.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	51,590	17,500	3	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	YES				
PARTICIPATION BY OTHER MINISTRIES:	NO				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Evaluation of contaminated water and soil sites as sources of airborne hazardous materials.

KEY WORDS: Contaminated water and soil, airborne hazardous materials.

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor D. MacKay

LIAISON OFFICER
OR SUPERVISOR B. Birmingham, A. Szokolcai

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT SOLICITED CONTRACT MULTI-YEAR PROJECT CONCURRENT PROJECT

OBJECTIVE: To develop equations for predicting the rate of volatilization (and hence the source strength to the atmosphere) of organic pollutants which are present in dispersed source from in water bodies or in soils.

DESCRIPTION:

Relevant equilibrium physical chemical properties of selected organic compounds will be measured and two small scale experimental systems will be set up and operated to validate the proposed equations and determine the kinetic parameters.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	51,000	17,000	3	1	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u> </u> PROJECT	OTHER <u> </u>	

IS A REPORT ANTICIPATED?
YES

PARTICIPATION BY OTHER MINISTRIES:
NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Provision of PAHs and Aza-PAHs as environmental analytical standards

KEY WORDS: PAH, synthesis

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor V. Snieckus, University of Waterloo

LIAISON OFFICER
OR SUPERVISOR O. Meresz, G.A. Rees, A. Szokolcai

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To provide PAHs and Aza-PAHs as analytical standards.

DESCRIPTION:

Known carcinogenic PAHs and aza PAHs will be synthesized by short and efficient routes using perviously worked out methods as well as alternaties.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	69,860	26,000	3	1	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
IS A REPORT ANTICIPATED?	YES				
PARTICIPATION BY OTHER MINISTRIES:	NO				

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: The chemoreceptive membrane as an electrochemical sensor for trace organic species in the atmosphere

KEY WORDS: Lipid membranes, trace organic gas analysis, electrochemical sensor

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor M. Thompson, University of Toronto

LIAISON OFFICER
OR SUPERVISOR O.W. Berg, O. Meresz, E. Singer

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop supported membrane systems for selective chemical sensing in the gas-phase.

DESCRIPTION:

This project will study the deposition and protection of lipid films on support and device structure. The properties of these films will be characterized, and the application of the films for selective gas sensing will be pursued.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
	50,000	15,000		3	1
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING		JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Determination of Metals and Metal Compounds in Air and related Samples

KEY WORDS: Multielement analysis, Mercury, Arsenic, gas chromatography - atomic fluorescence spectrometry.

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor J.C. Van Loon, University of Toronto

LIAISON OFFICER
OR SUPERVISOR D. Boomer

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: Development of sensitive analytical techniques for different chemical states of metals.

DESCRIPTION: GC-AFS methods previously developed for lead and manganese compounds in air will be extended to mercury and arsenic compounds.

DURATION OF PROJECT	<u>5</u> YEARS	PRESENT YEAR IS	<u>5th</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	94,500	18,000	5	1	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	<u>X</u>				

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Sampling and analysis of polycyclic aromatic hydrocarbon derivatives in urban air particulates.

KEY WORDS: Trace analysis, method development, nitro-PAH

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professors M.A. Quilliam and B.E. McCarry, McMaster University

LIAISON OFFICER
OR SUPERVISOR G. Foster, O. Meresz, W.C. Tam

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop analytical methodology for polycyclic aromatic hydrocarbon derivatives, particularly nitro- and oxy-PAHs in urban air particulates.

DESCRIPTION:

Much of the nitrogen activity observed in urban air particulate samples is associated with compound classes other than the well-studied PAHs. This project will try to establish analytical methodology for these compounds, mostly nitro- and oxy-PAH derivatives, and to examine their formation as artifacts in various sampling methods.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	Annual
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT 85,000	CURRENT YEAR 28,000	TOTAL PROJECT 4	CURRENT YEAR 1½	
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY		
	WORK <input checked="" type="checkbox"/>	MINISTRY <input type="checkbox"/>	FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>	
	PROGRAM	FUNDING	PROJECT		

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Development of a tunable diode laser based hydrogen peroxide monitor

KEY WORDS: Hydrogen peroxide, tunable diode laser

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professors H.J. Schiff and D. Hastie, York University

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a Turnable Diode Laser Absorption Spectrometer to measure the concentration of hydrogen peroxide in air.

DESCRIPTION: Hydrogen peroxide is an important intermediate in atmospheric chemical reactions. This monitor offers significant advances in sensitivity. The feasibility of measuring ammonia and formaldehyde with the same technique will be looked at.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	55,000	19,500	3	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	YES				
PARTICIPATION BY OTHER MINISTRIES:	NO				

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Chemical speciation of airborne particulate matter

KEY WORDS: Analysis, APM, Neutron Activation

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor D. Burgess, McMaster University

LIAISON OFFICER
OR SUPERVISOR A.B. Foster, K. Heidorn

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop procedures for the determination of the chemical composition of airborne particulate matter using volatilization and neutron activation analysis.

DESCRIPTION:

A procedure for the optimization of multielement neutron activation analysis and the conditions required for selective volatilization of compounds of interest will be studied.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>4th</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	49,233	13,000	4	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?
YES

PARTICIPATION BY OTHER MINISTRIES:
NO

REMARKS:



Ministry
of the
Environment
Ontario

- 30 -

AR-7
81 RR

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Synthesis of polynuclear aromatic hydrocarbons of interest in environmental pollution.

KEY WORDS: PAH, synthesis

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor E. Lee-Ruff

LIAISON OFFICER
OR SUPERVISOR O. Meresz, G.A. Rees, A. Szakolcai

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To prepare specific PAHs of interest in environmental chemistry. Samples are to be used as standards for characterization purposes.

DESCRIPTION: Analogues of cyclopenta (c,d) pyrene and benzo(a) pyrene are going to be prepared for characterization of possible hydrocarbon contaminants of unknown structure.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT 13,500	CURRENT YEAR 7,000	TOTAL PROJECT 2	CURRENT YEAR 1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Laser induced emission spectroscopy of polycyclic aromatic hydrocarbons in low temperature matrices.

KEY WORDS: PAH, analysis, method development, laser fluorescence

PRINCIPLE INVESTIGATOR
AND AFFILIATION Profs. S.V. Filseth, F.J. Morgan and C. Sadowski, York University

LIAISON OFFICER
OR SUPERVISOR O. Meresz, G.A. Rees, W.C. Tam

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a laboratory capability to obtain laser excited fluorescence spectra of PAH's in low temperature matrices.

DESCRIPTION:

A pulsed tunable dye laser will be used to excite the fluorescence spectra of trace quantities of PAH's in alkane matrices at 10-20 K in order to make quantitative analyses of complex mixtures obtained in environmental sampling programs.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	39,083	14,700	3	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	YES				
PARTICIPATION BY OTHER MINISTRIES:	NO				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Methods for sampling and analysis of asbestos air pollution in Ontario

KEY WORDS: Asbestos, Sampling, Analysis

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor D. Verma, McMaster University

LIAISON OFFICER
OR SUPERVISOR D. Corr, P. Roberts

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To obtain by electron microscopy baseline data for asbestos levels in outdoor air and relate these exposure levels to those obtained by traditional optical microscopy.

DESCRIPTION: Asbestos levels in various situations will be measured both e.m. and optical microscopy.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	75,000	27,000	3	1	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Inhalable particulate sampling

KEY WORDS: Particulate, aerosol, dichotomous samples

PRINCIPLE INVESTIGATOR
AND AFFILIATION D. Corr

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To determine inhalable/total particulate ratios at a number of urban sites across Ontario and to transfer the knowhow of inhalable particulate monitoring to regional staff. Data will be used to set an Ontario inhalable particulate standard.

DESCRIPTION: Dichotomous and Hi-vol particulate samplers are being operated at a number of regional sites throughout Ontario. Statistical assessment of airborne mass and elemental concentrations will follow.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	1st YEAR	REPORTING DATE	1985
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT 80,000	CURRENT YEAR 40,000	TOTAL PROJECT 2	CURRENT YEAR 1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/>	SPECIAL MINISTRY <input type="checkbox"/>	JOINTLY FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>	
	PROGRAM	FUNDING	PROJECT		

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources, Laboratory Services & Waste Management DATE: July, 1983

PROJECT TITLE: Trace Organic Contaminants

KEY WORDS: Waste, Incineration, Polychlorinated dibenzodioxins (PCDDs), Polychlorinated dibenzofurans (PCDFs), Chlorinated Aromatics, PCBs

PRINCIPLE INVESTIGATOR
AND AFFILIATION F. Hopton - ORF and H. Tosine - M.O.E Laboratory

LIAISON OFFICER
OR SUPERVISOR V. Ozvacic, Project Co-ordinator

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT	<u>X</u>	MULTI-YEAR PROJECT	<u>X</u>
CATEGORY:	GRANT	SOLICITED CONTRACT	<u>X</u>	CONCURRENT PROJECT	

OBJECTIVE: Determine quantities of PCDDs, PCDFs and other related species in all discharge steams into the environment at selected waste incinerator plants, identify likely precursors in the feedstock, develop measurement technology and monitor development of related health standards.

DESCRIPTION:

Dioxin guideline for ambient air and point of impingement was issued by the Minsitry of Labour and the ARB.

Sampling and preparation of sample extracts from the garbage incinerators - Commissioners Street in Toronto and SWARU in Hamilton - and a sewage sludge incinerator at Ashbridges Bay were completed

Chemcial analysis of sample extracts and sampling at Dow have been postponed because of a high priority sampling at SWARU.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	<u>March 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT 380,000	CURRENT YEAR NIL	TOTAL PROJECT <u>2 1/2</u>	CURRENT YEAR <u>1/2</u>	
SOURCE OF FUNDS:	REGULAR WORK <u> </u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u>X</u> PROJECT	OTHER <u> </u>	

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: Ministry of Energy, Co-Sponsor
Ministry of Labour, Health Effect Study

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Study on Adsorption Tube Storage and Sample Handling Techniques for Organic Vapor Sampling

KEY WORDS: Organic vapour, sampling handling, storage

PRINCIPLE INVESTIGATOR
AND AFFILIATION Ontario Research Foundation

LIAISON OFFICER
OR SUPERVISOR A. Szokolcai

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To determine the optimum storage and handling techniques for adsorption tubes used for sampling organic vapors.

DESCRIPTION: This is a joint ARB/ORF/LSB project. Adsorption tubes will be loaded with various concentrations of organic vapors at ARB, put through various handling and storage routines by ORF and analyzed by LSB. ORF will analyze the results statistically and recommend optimum storage and handling routines.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>April 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	27,842		3	3	
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input checked="" type="checkbox"/> FUNDING RAC	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	YES				
PARTICIPATION BY OTHER MINISTRIES:	NO				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE:

The dispersal of airborne particulates on a short and long term scale

KEY WORDS:

Aerosol, PIXE, Elemental Analysis, Tree, Historical Pollution

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Professor J.D. McArthur, Queens University

LIAISON OFFICER
OR SUPERVISOR

D. Balsillie, W.D. McIlveen

RESEARCH
CATEGORY:

INTERNAL ☐
GRANT ☒

UNSOLICITED CONTRACT ☐
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐
CONCURRENT PROJECT ☐

OBJECTIVE:

To determine short (20 min.) and long (before industrial revolution) time scale variations in air pollution.

DESCRIPTION:

Proton induced x-ray emission analysis will be applied to aerosol collected on filters and to tree rings.

DURATION
OF PROJECT

3 YEARS

PRESENT
YEAR IS

3rd YEAR

REPORTING
DATE

Annual

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT 41,000
CURRENT YEAR 17,000

MAN YEARS

TOTAL PROJECT 3
CURRENT YEAR 1

SOURCE OF
FUNDS:

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Retrospective Correlation Spectroscopy and its application to atmospheric monitoring

KEY WORDS: Retrospective digital correlation, atmospheric spectral data

PRINCIPLE INVESTIGATOR
AND AFFILIATION Professor R.W. Nicholls, York University

LIAISON OFFICER
OR SUPERVISOR W.H. Chan, L. Shenfeld

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To treat observational atmospheric spectra data so as to reveal column densities of numerous molecular pollutants

DESCRIPTION:

A number of digital correlation masks, each appropriate to the spectrum of a specific pollutant molecule will be prepared and calibrated. Correlation software and a field application program will be developed.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	43,500	13,000	3	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?
YES

PARTICIPATION BY OTHER MINISTRIES:
NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Gas phase photochemistry of polychlorinated biphenyls

KEY WORDS: PCB, gas phase photochemistry

PRINCIPLE INVESTIGATOR
AND AFFILIATION Prof. N.J. Bruce, University of Guelph

LIAISON OFFICER
OR SUPERVISOR M. Lusi, G.A. Rees

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To assess the photochemistry of individual PCB compounds in the gas phase in nitrogen and in air.

DESCRIPTION: An initial study will focus on the identification of reaction products and describe the main features of reaction mechanism. This may enable further investigation of the rates and quantum yields of photolysis, and modelling to estimate the rates of atmospheric photodegradation of these compounds.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT 45,000	CURRENT YEAR 22,500	TOTAL PROJECT 2	CURRENT YEAR 1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	YES				
PARTICIPATION BY OTHER MINISTRIES:	NO				

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: July, 1983

PROJECT TITLE: Organic Airborne Particulate Matter

KEY WORDS: Particulate, Aerosol, Organic, PAH

PRINCIPLE INVESTIGATOR
AND AFFILIATION W.C. Tam

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL ☒ GRANT ——— UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ——— CONCURRENT PROJECT ———

OBJECTIVE: To develop a field sampling-laboratory analytical methodology for PAH and to establish ambient air objectives and guidelines

DESCRIPTION: Different sampling methodologies will be compared to combat the problem of PAH loss due to evaporation and oxidation.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	Nov. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	110,000	50,000	3	1	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ———	

IS A REPORT ANTICIPATED?
YES

PARTICIPATION BY OTHER MINISTRIES:
NO

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources DATE: July, 1983

PROJECT TITLE: Organic Vapour Sampling

KEY WORDS: Organic Vapour, Sampling

PRINCIPLE INVESTIGATOR
AND AFFILIATION A. Szokolcai

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:
To develop a reliable method of sampling vapours in the field with subsequent analysis in the laboratory.

DESCRIPTION:
An organic vapour dynamic standards generator will be used to examine different adsorbent tube - pump combinations to determine breakthrough characteristics and proper sample handling procedures.

DURATION OF PROJECT: 3 YEARS PRESENT YEAR IS 3rd YEAR REPORTING DATE: 1984

BUDGET: TOTAL DOLLARS TOTAL PROJECT 105,000 CURRENT YEAR 25,000 MAN YEARS TOTAL PROJECT 2 CURRENT YEAR 1

SOURCE OF FUNDS: REGULAR WORK ☒ PROGRAM SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS:



Ministry
of the
Environment
Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Northeastern Region

DATE:

PROJECT TITLE:

Biogeochemical Study, Northeastern Ontario

KEY WORDS:

Biogeochemical, Acid Precipitation

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Northern Terrestrial Consultants, Sudbury

LIAISON OFFICER
OR SUPERVISOR

Dr. W.D. McIlveen

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT X

MULTI-YEAR PROJECT X
CONCURRENT PROJECT —

OBJECTIVE:

To document changes in elemental distribution and nutrient cycling within a forested ecosystem under the influence of acidic precipitation. The selected site is located near High Falls, Agnew Lake.

DESCRIPTION:

The work consists of operating a network of incident precipitation collectors, throughfall collectors, stemflow collectors, stream flow monitoring, soil lysimeters, low volume air sampler, defining snow pack characteristics, erosional losses of materials, evapo-transpiration rates. The study also includes sampling of vegetation chemical composition and litterfall chemical composition.

DURATION
OF PROJECT

— YEARS PRESENT
YEAR IS 2 YEAR

REPORTING
DATE March 31, 1984

BUDGET:

TOTAL DOLLARS
TOTAL PROJECT CURRENT YEAR
98,000

MAN YEARS
TOTAL PROJECT CURRENT YEAR
2

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM SPECIAL
MINISTRY X
FUNDING

JOINTLY
FUNDED — OTHER —
PROJECT

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Natural Resources (Manpower for forest inventory assessment)

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Northeastern Region DATE: _____

PROJECT TITLE: Installation of monitoring equipment for
Biogeochemical Study

KEY WORDS: Biogeochemical, Acid Precipitation

PRINCIPLE INVESTIGATOR
AND AFFILIATION Northern Terrestrial Consultants

LIAISON OFFICER
OR SUPERVISOR Dr. W.D. McIlveen

RESEARCH CATEGORY: INTERNAL X UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X
GRANT — SOLICITED CONTRACT X CONCURRENT PROJECT —

OBJECTIVE:
To establish monitoring equipment on a forested ecosystem to
determine impact of acid precipitation on the system. The
Study site is located near High Falls at Agnew Lake.

DESCRIPTION:
To put in place and verify operation of precipitation throughfall
collectors, stemflow collectors, dam on weir and installation of
stream flow recorders, install soil lysimeters and construction
of access paths required to reach all monitoring sites.

DURATION OF PROJECT — YEARS PRESENT YEAR IS 2 YEAR REPORTING DATE March 31, 1981

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR
76,500 2

SOURCE OF FUNDS: REGULAR WORK — SPECIAL MINISTRY X JOINTLY FUNDED — OTHER —
PROGRAM FUNDING PROJECT

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: _____

REMARKS:
Meteorological and air quality monitoring to be carried
out by MOE staff.

RESEARCH AND DEVELOPMENT INVENTORY

ANCH:

Air Resources

DATE:

OBJECT TITLE:

Statistical Analysis

KEY WORDS:

atmospheric modelling

PRINCIPAL INVESTIGATOR

DEPARTMENT AFFILIATION

Concord Scientific

ASSISTANT OFFICER

SUPERVISOR

P.K. Misra

SEARCH

INTERNAL —

UNSOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CATEGORY:

GRANT —

SOLICITED CONTRACT —

CONCURRENT PROJECT —

OBJECTIVE:

to provide statistical analyses in support of the development of models of the atmospheric transport and deposition of air pollutants.

DESCRIPTION:

see above

PERIOD OF PROJECT	1 YEARS	PRESENT YEAR IS	1 YEAR	REPORTING DATE
BUDGET:	\$46,480	TOTAL DOLLARS		MAN YEARS
		TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
		APIOS		

A REPORT ANTICIPATED?

no

PARTICIPATION BY OTHER MINISTRIES:

none

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

ANCH: Air Resources

DATE:

OBJECT TITLE: Performance and Systems Audits of APIOS Networks

KEY WORDS: deposition monitoring, quality assurance

PRINCIPLE INVESTIGATOR

ORGANIZATION AFFILIATION Concord Scientific

PRINCIPAL OFFICER
SUPERVISOR Maris Lusia

SEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT ~~—~~ MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: to provide an objective assessment of the APIOS cumulative and event networks with attention to data quality as it relates to siting, sample collection, and analytical procedures.

DESCRIPTION:

RATION		2		PRESENT		1		REPORTING		March 84, 85	
PROJECT		YEARS		YEAR IS		YEAR		DATE			
BUDGET:		TOTAL DOLLARS						MAN YEARS			
		TOTAL PROJECT			CURRENT YEAR			TOTAL PROJECT		CURRENT YEAR	
		\$51,246			\$25,307						
SOURCE OF		REGULAR			SPECIAL			JOINTLY			
FUNDS:		WORK			MINISTRY			FUNDED		OTHER	
		PROGRAM			FUNDING APIOS			PROJECT			

A REPORT ANTICIPATED?

yes
PARTICIPATION BY OTHER MINISTRIES:

none

MARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE:

PROJECT TITLE: Eulerian Model Development

KEY WORDS: air pollution, transport, mathematical model

PRINCIPLE INVESTIGATOR
AND AFFILIATION ERI, Boston; MEP, Toronto

LIAISON OFFICER
OR SUPERVISOR P. K. Misra

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a mathematical model to describe the transport and deposition of air pollutants using an Eulerian model framework.

DESCRIPTION:

DURATION OF PROJECT	4 YEARS	PRESENT YEAR IS	2 YEAR	REPORTING DATE	Quarterly
BUDGET:	\$400,000	TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR \$400,000		MAN YEARS TOTAL PROJECT CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input checked="" type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? yes

PARTICIPATION BY OTHER MINISTRIES: Federal Department of the Environment
Republic of West Germany

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

ANCH: Air Resources

DATE:

OBJECT TITLE: Compilation of a VOC Emission Inventory for the Province of Ontario

KEY WORDS: volatile organics, emission inventory

PRINCIPLE INVESTIGATOR

INSTITUTION AFFILIATION: Environmental Applications Group

PRINCIPAL OFFICER
SUPERVISOR: Simon Wong

SEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: to produce an inventory of volatile organics in Ontario

DESCRIPTION: see above

PERIOD OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>March/84</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	\$70,000 MOE	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$45,000 DOE				
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
IS A REPORT ANTICIPATED?					
PARTICIPATION BY OTHER MINISTRIES:					
DOE is supplying \$45,000.					

REMARKS:

II. WATER POLLUTION RESEARCH



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"DEVELOPMENT OF AN EXPERIMENTAL MARSH TREATMENT FACILITY AT LISTOWEL, ONTARIO."

KEY WORDS: Listowel, Marsh, Experimental Marsh, Heavy Metals, Nutrients,
Bacterial Contamination.

PRINCIPLE INVESTIGATOR AND AFFILIATION M. Palmer, Gore and Storrie Ltd.

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

To establish a pilot artificial marsh sewage treatment system to: 1) determine the effectiveness of the system for reducing bacteriological contamination, heavy metals and nutrients on a year round basis; 2) assess the cost of establishing and operating a marsh-type sewage treatment system in relation to presently accepted modes of treatment; 3) seek the best design and operation of an artificial marsh system, including possible need for plant harvesting measures.

DESCRIPTION:

Project consists of design, construction and monitoring of pilot artificial marsh sewage treatment system. The system occupies a total area of 2.5 acres and provides for flexibility of operation in terms of retention times, quality, and quantity of sewage influent. Both lagoon effluent and effluent from an aerated cell are used. Some of the emergent vegetation cells will be channeled to permit plant harvesting. It is anticipated that artificial marshes will be effective in reducing bacterial counts and other contaminants.

DURATION OF PROJECT	3 YEARS	PRESENT YEAR IS	5th YEAR Carryover	REPORTING DATE	1986
BUDGET: Total to be paid with Lottery Funds = \$398,300	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$554,140	\$33,300	See below for partners.		
SOURCE OF FUNDS:	REGULAR X WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY X FUNDED <input type="checkbox"/> PROJECT	OTHER X Provincial Lottery	

IS A REPORT ANTICIPATED?

Yes. Progress Reports released.

PARTICIPATION BY OTHER MINISTRIES:

None. This Project is shared with Water Resources Branch and Southwestern Region.

REMARKS:

Funding:	Provincial Lottery Capital Costs	\$284,340
	Provincial Lottery labour Costs at Listowel	51,000
	Southwestern Region	69,000
	Water Resources Branch	85,000
	SUB-TOTAL	\$489,340
	Extended funding 83-85	64,800
	TOTAL	\$554,140



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "DEVELOPMENT OF NON-CHEMICAL APPROACHES TO PEST CONTROL (STERILE MALE ONION MAGGOT TECHNIQUE)."

KEY WORDS: Non-Chemical Pesticides, Sterile Male Onion Maggot, Onion Control, Biological Control, Pest Control

PRINCIPLE INVESTIGATOR F. L. McEwen,
AND AFFILIATION University of Guelph

LIAISON OFFICER D. Wilson
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To construct a facility for mass rearing and quarantine of insects used for biological control and for mass rearing of insects for sterile male release in integrated pest management programs. To conduct a field experiment in which sterile onion maggots are released in sufficient quantity to compete with wild flies in the field and prevent their reproduction. The Keswick Marsh (about 300 acres of onions) will be used as the test site. The nature of the trial is such that it will require one year after the building is completed before 100,000,000 flies will be produced and available for release. It will then be necessary to have 2 years of field programs of release.

DESCRIPTION:

Recognizing the inadequacy of chemicals to control our pest problems, many researchers have studied alternatives and it is now clear that a pest management approach embodying the integration of chemicals and biological controls is a sound tactic.

Led by studies in the United States, the culture and release of sterilized insects has achieved outstanding success with the screwworm and certain tropical fruit flies, and in Holland and Ontario this method appears feasible for onion maggot and possibly carrot rust fly and carrot weevil.

To develop a center of expertise in non-chemical approaches to pest control and to integrate these approaches into effective pest management programs. At the end of the grant period, the University accepts responsibility for the maintenance and operation of the facility as an integral part of its ongoing research program.

DURATION OF PROJECT	PRESENT YEAR IS		REPORTING DATE
	3 YEARS	1st YEAR	
			1984

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$237,500	\$110,000	None from MOE	

SOURCE OF FUNDS:	REGULAR WORK PROGRAM		SPECIAL MINISTRY FUNDING		JOINTLY FUNDED PROJECT		OTHER	
					X		X	Provincial Lottery

IS A REPORT ANTICIPATED? Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES: Ministry of Agriculture & Food and Agriculture Canada.

REMARKS: O.M.A.F. funded the project alone in FY 80-81.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"AQUATIC TOXICITY STUDIES OF MULTIPLE ORGANIC COMPOUNDS."

KEY WORDS: Aquatic Toxicity, Organics in Water, Industrial Wastes,
Fish Testing, Biological Testing, Hazardous Contaminants.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. G. W. Ozburn and Dr. D. E. Orr, Department of Biology,
Lakehead University, Thunder Bay, Ontario P7B 5E1

LIAISON OFFICER

OR SUPERVISOR G. R. Craig

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☒

OBJECTIVE:

To determine the effective biological concentrations of selected organics commonly discharged in industrial wastes.

The effects of individual industrially related organic compounds on fish reproduction as well as rates of accumulation and depuration of those organics will be determined. Mixtures of the individual organics will also be tested to determine their joint toxicity effects on the same biological parameters.

DESCRIPTION:

Exposure of flagfish to these selected organics will identify concentrations that impair or inhibit egg production, hatching success, fry survival and growth. Bio-concentration factors due to uptake from water will also be determined. Rates of uptake through food will be determined in rainbow trout to establish food chain effects.

Once individual organic effects are established, mixtures of those organics representative of concentrations found in river systems will be tested to determine synergistic, additive or antagonistic effects on reproduction and bio-accumulation.

Concentrations of industrial organic compounds that produce detrimental effects on fish reproduction and recruitment will be established. Levels of organics accumulation that impair or reduce the edibility of sport and commercial fish will be determined in light of biological, chemical and mutagen/carcinogen studies reported in the literature or under study in other environmental laboratories.

DURATION OF PROJECT	3 YEARS	PRESENT YEAR IS	3rd YEAR	REPORTING DATE	1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
		\$5,200 from MOE		None from MOE	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	<input checked="" type="checkbox"/>	JOINTLY FUNDED PROJECT	<input checked="" type="checkbox"/>
				OTHER	<input checked="" type="checkbox"/>
				Provincial Lottery Fund	
IS A REPORT ANTICIPATED?	Yes				

PARTICIPATION BY OTHER MINISTRIES: No. This project was supported in FY 80-81 with Bridge Funding from Lottery Project No. 48 for \$10,900.

REMARKS:

Partners in FY 80-81 were Environment Canada and MOE Hazardous Contaminants Branch. Contribution from Lottery Funds is one half, e.g. \$175,420.



Ontario

Ministry
of the
Environment

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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"REMOVAL OF HAZARDOUS CONTAMINANTS IN THE HAMILTON WPCP."

KEY WORDS: Contaminants Removal, Hazardous Contaminants, Sewage Treatment.

PRINCIPLE INVESTIGATOR Dr. R. Rush
AND AFFILIATION Canviro Consultants Ltd.LIAISON OFFICER
OR SUPERVISOR A. HoRESEARCH CATEGORY: External INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE:

- To provide annual loadings of hazardous contaminants in WPCP discharges in Hamilton Harbour.
- To assess contaminants removal efficiency through analysis of seasonal samples.

DESCRIPTION:

DURATION OF PROJECT	YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE	1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$55,600	\$32,400			
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY <u>Regular</u> FUNDING Research	JOINTLY FUNDED ——— PROJECT	OTHER	———

IS A REPORT ANTICIPATED? Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

Department of the Environment. One part of collaborative study carried out by MOE, and

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"EXPERIMENTAL MODELLING STUDIES OF HAZARDOUS SUBSTANCES IN ONTARIO."

KEY WORDS:

Hazardous Contaminants Modelling, Environmental Fate.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. D. Mackay, Department of Chemical Engineering
University of Toronto

LIAISON OFFICER OR SUPERVISOR Dr. A. Szokolcai

RESEARCH CATEGORY: External INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To study environmental fate of specific toxic substances and devise novel hazard assessment methods. The developed model will be extended to include human exposure.

DESCRIPTION:

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>1985</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$165,000	\$25,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"BIOLOGICAL MODEL FOR PARTITIONING OF MERCURY, LEAD AND
CADMIUM IN AQUATIC SYSTEMS."

KEY WORDS:

Heavy metals, Environmental Fate, Aquatic Biological Model

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. P. Stokes, Department of Botany
University of Toronto

LIAISON OFFICER
OR SUPERVISOR

J. Ralston

RESEARCH

CATEGORY: External

INTERNAL
GRANT X

UNSOLICITED CONTRACT
SOLICITED CONTRACT

MULTI-YEAR PROJECT
CONCURRENT PROJECT

OBJECTIVE:

- To investigate the fate of some toxic metals and their bioaccumulation.
- To study the use of algae for biomonitoring of aquatic pollution.
- To use the produced data in a "unit world" microcosm.

DESCRIPTION:

DURATION
OF PROJECT

 1 YEARS

PRESENT
YEAR IS

 2nd YEAR

REPORTING
DATE 1984

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$13,000
CURRENT YEAR -

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK
PROGRAM

SPECIAL
MINISTRY
FUNDING Regular
Research

JOINTLY
FUNDED OTHER
PROJECT

IS A REPORT ANTICIPATED?

Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

None.

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"WATER QUALITY ANALYSIS OF TROUT FARM EFFLUENT."

KEY WORDS:

Fish Farm Effluent, Water Quality.

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. J. Hilton and Dr. S. Slinger, Department of Nutrition
University of Guelph

LIAISON OFFICER
OR SUPERVISOR

E. Leggatt

RESEARCH

CATEGORY: External

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

- To determine water quality of trout farm effluents and correlate the results to farm operating practices.
- To determine the effects of dietary phosphorous on growth and physiology of fish and on wastewater quality.

DESCRIPTION:

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

1984

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

\$16,400

\$16,400

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR

WORK

PROGRAM

SPECIAL

MINISTRY

FUNDING

JOINTLY

FUNDED

PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: EVALUATION OF DATA OF PROJECT 28 PL - 'EFFECTS OF HYDRAULIC CHARACTERISTICS AND EFFLUENT CHLORINATION ON THE INCIDENCE OF MICROORGANISMS OF PUBLIC HEALTH SIGNIFICANCE IN RECEIVING WATERS.'

KEY WORDS: Effluent, Chlorination, Wastewater Treatment, Effluent microorganisms

PRINCIPLE INVESTIGATOR
AND AFFILIATION Contractor to be selected

LIAISON OFFICER
OR SUPERVISOR A. Burger

RESEARCH CATEGORY: External INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE:

- To develop a critique of the statistical methodology used in Project 28 PL and devise a new approach if the former is inappropriate.
- To integrate the data in the appropriate model.
- To conduct statistical analysis of data.

DESCRIPTION:

DURATION OF PROJECT 1 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE 1985

BUDGET: TOTAL DOLLARS MAN YEARS
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR
\$20,000 -

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING Provincial Lottery JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"CONTAMINANT MOBILIZATION AND UPTAKE FROM MINE TAILINGS
AT COBALT, ONTARIO."

KEY WORDS: Contaminant Mobilization, Environmental Fate, Mine Tailings at Cobalt.

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Hanna Associates Inc.

LIAISON OFFICER

OR SUPERVISOR

G. Miller

RESEARCH

CATEGORY: External

INTERNAL —

GRANT —

UNSOLICITED CONTRACT X MULTI-YEAR PROJECT —

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

- To determine the mobility and bioavailability of contaminants, primarily heavy metals, in mine tailings under varying moisture and chemical regimes. Field monitoring will be correlated to laboratory testing.

DESCRIPTION:

DURATION
OF PROJECT

2 YEARS

PRESENT

YEAR IS

1st YEAR

REPORTING

DATE

1985

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

\$49,400

CURRENT YEAR

\$5,000

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR

WORK —

PROGRAM

SPECIAL

MINISTRY —

FUNDING

JOINTLY

FUNDED —

PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "EFFECTS OF METALS FROM MINE TAILINGS ON THE MICROFLORA OF A MARSH TREATMENT SYSTEM."

KEY WORDS: Marsh treatment systems, Effect of Metals on Microflora, Mine Tailings

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. P. Seyfried, Department of Microbiology
University of Toronto

LIAISON OFFICER OR SUPERVISOR K. Roberts

RESEARCH CATEGORY: External INTERNAL GRANT X UNSOLICITED CONTRACT SOLICITED CONTRACT MULTI-YEAR PROJECT CONCURRENT PROJECT

OBJECTIVE:

- To assess the effect of metals on the normal microflora of a marsh treatment system.
- To determine if the pH of the effluent has an effect on toxicity.
- To compare metal susceptibility of heterotrophic bacteria from mine tailings and normal marsh systems.

DESCRIPTION:

The potential toxic effects of metals on the microflora of a marsh system at Cobalt will be determined. Laboratory test will include the effects of toxic metals both individually and in combinations at various pH. Quantitative toxicity assessment will be performed.

DURATION OF PROJECT	<u> 2 </u> YEARS	PRESENT YEAR IS	<u> 1st </u> YEAP	REPORTING DATE	<u> 1984 </u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$49,000	\$24,000			
SOURCE OF FUNDS:	REGULAR WORK <u> </u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u> </u> PROJECT	OTHER <u> </u>	
		Regular Research			
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "EFFECTS ON THE MUSCLE OF YOUNG FISH AND RATS OF EXPOSURE TO
LEAD, CADMIUM AND MERCURY."

KEY WORDS: Effects of heavy metals on Fish and rats.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. D. M. Nicholls, Department of Biology
York University

LIAISON OFFICER OR SUPERVISOR G. Craig

RESEARCH CATEGORY: External INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

- To study enzymatic effects and genetic activities on fish and young rats due to exposure to lead, cadmium and mercury. R.N.A. will be examined for alterations in quality and quantity of gene expression. Enzyme reactions in fish due to exposure to metals will be investigated.

DESCRIPTION:

Test animals and fish will be examined with respect to functional activities, enzymes of protein synthesis, and for genetic changes due to exposure to toxic metals lead, cadmium and mercury.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$16,310	\$16,310			
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	
		Provincial Lottery			
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "OCCURRENCE AND MOBILITY OF HAZARDOUS ORGANIC CHEMICALS IN
GROUNDWATER AT ONTARIO LANDFILLS."

KEY WORDS: Mobility of hazardous contaminants, groundwater contaminant, landfill

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J. Cherry, Groundwater Research Institute
University of Waterloo

LIAISON OFFICER OR SUPERVISOR Dr. G. Hughes

RESEARCH CATEGORY: External INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:
- to study and determine the nature, concentrations and mobility of hazardous organic compounds that occur in groundwater at representative municipal landfills in Ontario.

DESCRIPTION:

The study will consist primarily of field investigations that will take place at 7 landfills in a variety of hydrogeologic settings in Ontario. Four of these landfills have been studied as part of our previous Lottery Fund project, which focused on inorganic contaminants. These landfills already have good groundwater monitoring networks. Monitoring networks will be installed at the 3 additional landfills. The landfills represent various ages and are situated in different geologic and hydrologic settings. Sampling of the groundwater monitoring networks will provide information on the spatial and temporal distributions of organic contaminants. These distributions will be related to various factors such as landfill age, type of waste, hydrogeological conditions, and contaminant mobility and attenuation.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1986</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$331,000	\$61,300			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS:

CANADIAN MINISTRY OF THE ENVIRONMENT
CANADA-ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE: * 01 001 06 1

PROJECT NAME: Environmental Impacts of In-place Pollutants in Sediments

FILING DATE: 7 February, 1983 PROJECT YEAR: 1 DURATION: ongoing

BRANCH/SECTION: Water Resources Branch PROJECT GROUP: Investigation & Assessment Unit
Great Lakes Section

OBJECTIVE: To assess the potential hazards of selected contaminants in sediments at several areas of known sediment contamination in the Great Lakes and develop strategies for the management of contaminated sediments where required. The assessment will address:

- (a) The levels of the contaminants in sediments.
- (b) The levels of contaminants in benthic organisms.

BACKGROUND: (c) The potential availability and danger to biota of selected metals.

The need to assess the environmental impacts of contaminated bottom sediments in the Great Lakes has become quite apparent within the last few years. Since sediments become the repository for most contaminants that enter the aquatic environment, constant assessment of the presence and potential dangers to human health and the aquatic ecosystem is necessary. In its revised terms of reference (Feb. 7, 1983), the IJC Dredging Subcommittee has been charged with the additional task of "Investigating the environmental impact of "In-place Pollutants" and recommending alternate strategies and options for mitigating various problems associated with the presence and/or removal of in-place pollutants, especially in the case of "18 Class A Areas of Concern" identified in the 1982 Water Quality Board Report.

This study will examine some of the Class A areas of concern where in-place pollutants have been identified as problems. This study will also examine emerging problems in selected nearshore areas where existing sediment data indicate concern. The information gathered will be used towards the development of management strategies to alleviate any recognized problems.

SCOPE: A sediment and macrobenthic survey will be carried out during the summer of 1983. This survey will cover the following Class A areas: St. Marys River, Niagara River and emerging problems in the Toronto Waterfront area (Harbour, Humber Bay, Ashbridges Bay). The sediment samples collected will be analyzed for particle size and selected organic trace contaminants and heavy metals. The chemical partitioning of the metals within the sediments will also be determined through sequential extraction. Taxonomic identification and determination of body burden levels of the contaminants analysed for within sediment samples will be carried out for the benthic macroinvertebrates.

ASPECTS COMPLETED DURING PREVIOUS YEAR: None

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): Sampling of other areas in the Great Lakes.

EST. EFFORT/COST THIS FORECAST PERIOD	EST. LAB TEST LOAD *	PEST: 60
MAN-YEAR: 0.5 COST: \$ 80 K	WQ: MICRO: ITC: 800 OTC: 30	

PROJECT LEADER: D. Persaud TEL: 965-6957

OUTPUT AND REMARKS: Follow up action to recommendations by International Joint Commission
*This test load is for the Toronto Waterfront area only. Test load allotments for the remaining study areas have been secured in other Great Lakes surveillance projects.

PROJECT NAME: Toronto Waterfront (c) Effects of Dredging/Lakefilling Activities

FILING DATE: February 1983

PROJECT YEAR: 4

DURATION: Ongoing

BRANCH/SECTION: Water Resources Branch
Great Lakes Section

PROJECT GROUP: Investigation & Assessment Unit

OBJECTIVE: (1) To monitor water quality at the Toronto waterfront to assess potential interference with water uses such as drinking water supplies, aquatic life, recreation, etc.

(2) To trace and quantify the movement of particulate material lost to the lake both in suspended sediment plumes and at depth during spoils disposal and lakefilling.

BACKGROUND: (3) To assess the impact of lakefilling activities on benthic organisms.

Intensive studies conducted during 1980-82 to monitor the effects of dredging/lakefilling activities on water quality in the Toronto waterfront indicated that the short-term effects on surface waters were localized. Observations from a 1982 diver reconnaissance survey and from limited use of a transmissometer suggest that there may be considerable movement of material at depth when observations of surface sediment plumes reveal little loss of material from lakefilling. As a result of these findings subsurface movement of particulate material requires investigation in order to evaluate potential long-term effects of dredging/lakefilling activities.

SCOPE: (1) Water at Toronto filtration plants will be monitored for heavy metals, PCBs, and OC pesticides during periods of high turbidity (i.e. storm conditions) and thermal bar formation. Surface plumes will be monitored via aerial surveillance and suspended sediment samples will be obtained using a centrifuge.

(2) Subsurface movement of material away from the headland will be assessed with the aid of a transmissometer (initial use of this instrument will be checked against diver observations).

(3) Underwater sediment traps will be positioned near the toe of the headland. The traps will be deployed by divers and retrieved on a monthly basis throughout the spring, summer and fall. Sediment collected in these traps will be analyzed for grain size and chemistry.

(4) Enumeration and speciation of benthic organisms will be carried out on samples collected by divers over a grid surrounding the headland.

ASPECTS COMPLETED DURING PREVIOUS YEAR: Monitoring of water quality at filtration plant intakes, and in the vicinity of the headland was undertaken following storm conditions.

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): 1983-84 data will be analyzed and a report discussing the findings will be prepared.

EST. EFFORT/COST THIS FORECAST PERIOD	EST. LAB TEST LOAD	PEST: 100
MAN-YEAR: 1.5	COST: \$ 150 K	WQ: 1500 MICRO: 300 ITC: 1200 OTC:

PROJECT LEADER: M. Griffiths, D. Persaud

TEL: 965-6957

OUTPUT AND REMARKS: Findings from this survey will be used to identify effectiveness of precautionary control programs designed to minimize potential impact on water use in the Toronto waterfront.

ONTARIO MINISTRY OF THE ENVIRONMENT
CANADA-ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE:

PROJECT NAME: Toronto Waterfront - d) Circulation

FILING DATE: February 1983

PROJECT YEAR: 3

DURATION: 3

BRANCH/SECTION: Water Resources Branch
Great Lakes Section

PROJECT GROUP: Investigation & Assessment Unit

OBJECTIVE: To document the physical processes in the Eastern Toronto Waterfront between Toronto Harbour and R. C. Harris water intake.

To identify the physical characteristics of Humber Bay.

BACKGROUND: Current meter operations during 1981 and 1982 characterized ambient flow conditions in the Eastern Toronto Waterfront from Toronto Headland to R.C. Harris WTP intake. Additional current information is required to characterize the remaining nearshore area of the Toronto Waterfront to allow identification of effects of such major source inputs as the Humber River, the Humber STP, and effects of construction activities such as the Eastern Headland on ambient flow and water quality conditions.

SCOPE: The study will document the circulation processes and flow structure in the Eastern Toronto Waterfront, as well as the dispersion characteristics. Data analysis, interpretation of 1982 information will be carried out during 1983-84 and a report will be prepared.

Five current meters will be operated from April 1983 to March 1984, at selected locations to identify the physical and dispersion characteristics between Humber Bay Park and Gibraltar Point (Centre Island). This knowledge would be used to determine the effects of discharges in the bay on water quality.

ASPECTS COMPLETED DURING PREVIOUS YEAR: Six current meters were operated during 1982 in Eastern Toronto Waterfront. A report is now under preparation.

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S) Data processing, interpretation and report writing.

EST. EFFORT/COST THIS FORECAST PERIOD

MAN-YEAR: 0.5 COST: \$50 K

EST. LAB TEST LOAD

WQ:

MICRO:

ITC:

PEST:

OTC:

PROJECT LEADER: B. Kohl+

TEL: 965-6957

OUTPUT AND REMARKS: Data on circulation patterns will aid in the dispersion assessments of inputs discharging into the area.

ONTARIO MINISTRY OF THE ENVIRONMENT
CANADA-ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84
LIS PROGRAM CODE: 01 001 15 35
01 001 10 35

PROJECT NAME: St. Clair and Detroit River Biomonitoring

FILING DATE: February 9, 1983 PROJECT YEAR: 2 DURATION: 3

BRANCH/SECTION: Water Resources Branch PROJECT GROUP: Investigation & Assessment Unit
Great Lakes Section Southwestern Region

OBJECTIVE: Assess effects of point source discharges at existing or potential problem sites.

Provide information relevant to the need for remedial action or assessment of remedial measures. Determine the fate of organic compounds in the St. Clair System.

BACKGROUND: The St. Clair River Organics Study (1977/78) indicated that several of chlorinated aromatics and chlorophenol compounds are discharged to the river. Industries such as Dow Chemical and Polysar have extended some of the outfalls into the river to achieve adequate dispersion and minimize the impact on industrial intakes located along the shore.

A study carried out during 1980 in the Detroit River revealed that river sediments are heavily contaminated with PCB's and pesticides, especially near the River Rouge and Detroit sewage treatment plant.

SCOPE: Follow-up study in the Detroit River around Fighting Island, utilizing freshwater clams in conjunction with young-of-the-year fish sampling.

ASPECTS COMPLETED DURING PREVIOUS YEAR: In 1982, biomonitoring using freshwater clams was carried out at 10 sites along the Ontario and U.S. shorelines of the St. Clair River, 4 sites in the St. Clair Delta and Lake St. Clair and 17 sites along the Ontario and U.S. shorelines of the Detroit River. In addition, Southwestern Region collected native clams from Lake St. Clair to enable differentiation between short and long term uptake effects.

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): Further assessment of biomonitoring results relative to identification of sources of contaminants; assessment of potential transboundary effects as part of intensive study year under GLISP (proposed).

EST. EFFORT/COST THIS FORECAST PERIOD		EST. LAB TEST LOAD		PEST: 40	
MAN-YEAR: 0.5	COST: \$ 34 K	WQ: 160	MICRO: ITC: 260	OTC: 10	

PROJECT LEADER: P. Kauss, Y. Hamdy

TEL: 965-6957

OUTPUT AND REMARKS: Findings will be assessed to address issues raised under "objective" section.

CANADIAN MINISTRY OF THE ENVIRONMENT
CANADA-ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE 01 001 01 03

PROJECT NAME: Nipigon Bay Environmental Survey

STARTING DATE: 7 February, 1983 PROJECT YEAR: 2 DURATION: 3

BRANCH/SECTION: Water Resources Great Lakes Section PROJECT GROUP: Investigation & Assessment Unit Toxicity Unit, Northwestern Region

OBJECTIVE: Determine the degree and extent of impairment of the aquatic environment in the Nipigon Bay area as a result of wastewater discharges from Domtar Packaging pulp and paper mill and the Red Rock sewage treatment plant (STP). Characterize mill and STP wastewaters. Update findings of the 1976 Upper Lakes Reference Group, assess changes and identify emerging problems.

BACKGROUND: Previous examinations of Nipigon Bay revealed significant water quality impairment in the vicinity of the mill outfall with respect to solids, phenolic compounds, dissolved oxygen and bacteria. Rainbow trout exposed to various concentrations of mill effluent exhibited tainting. The sediments of Nipigon Bay were characterized by a decrease in pH, increased organic matter and above average concentrations of total sulphur and mercury.

SCOPE: Mill and STP effluents and lake water samples will be collected daily for 3 days, during the summer of 1983 and analyzed for selected pesticides, trace contaminants, bacteria and other chemical and physical variables. Sediment and benthos samples will be collected in the fall and analyzed, as above, where possible. In addition the benthos will be enumerated and identified. This study forms part of the GLISP for Lake Superior and will be conducted in conjunction with the Lake Superior trace contaminant biomonitoring study, the embayment sediment benthos survey, and the nearshore young-of-the-year fish contaminants surveillance program. Fish toxicity assays, fish tainting and trace contaminant analyses of fish flesh will be undertaken simultaneously by the Toxicity Unit.

ASPECTS COMPLETED DURING PREVIOUS YEAR: Preliminary characterization of the mill effluent as part of the 1982-83 Lake Superior pulp and paper effluent characterization program.

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): Data analyses, production of reports.

EST. EFFORT/COST THIS FORECAST PERIOD		EST. LAB TEST LOAD		PEST: 178	
MAN-YEAR: 0.5	COST: \$ 90 K	WQ: 1620	MICRO: 315	ITC: 1693	OTC: 103

PROJECT LEADER: C. Cherwinsky

TEL: 965-6957

OUTPUT AND REMARKS: MOE report and data input to GLISP Lake Superior and the annual IJC Water Quality Board reports. Data will also be used in the formulation of pulp and paper effluent guidelines and issues of control orders.

TO MINISTRY OF THE ENVIRONMENT
 CANADA-ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE: 01 001 01 42

PROJECT NAME: Lake Superior - Trace Contaminant Biomonitoring Program

STARTING DATE: 7 February, 1983 PROJECT YEAR: 1 DURATION: 2

BRANCH/SECTION: Water Resources PROJECT GROUP: Investigation & Assessment Unit
 Great Lakes Section Northwestern Region

OBJECTIVE: Detect the levels of organic and inorganic trace contaminants in Lake Superior and attempt to assess the impact of trace contaminants discharged into Jackfish Bay on the raw water intake of the Terrace Bay water treatment plant (WTP).

BACKGROUND: Various organic and inorganic trace contaminants responsible for fish tainting, taste and odour problems, toxicity or bioaccumulation in fish and other biota have been identified in waters of Lake Superior receiving pulp and paper mill process wastes.

SCOPE: Fresh water clams indigenous to northwestern Ontario will be used to monitor PCB's, organochlorine pesticides and other organic and inorganic trace contaminants in Nipigon Bay, Peninsula Harbour and along a transect extending from the mouth of Blackbird Creek in Jackfish Bay to the town of Terrace Bay on Lake Superior. This program complements the Nipigon Bay and Peninsula Harbour environmental studies.

ASPECTS COMPLETED DURING PREVIOUS YEAR: None

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): Data analyses and report preparation.

EST. EFFORT/COST THIS FORECAST PERIOD		EST. LAB TEST LOAD		PEST: 126	
W-YEAR: 0.5	COST: \$ 58 K	WQ:	MICRO:	ITC: 702	OTC: 36

PROJECT LEADER: C. Cherwinsky TEL: 965-6957

INPUT AND REMARKS: Data used to input reports generated by other Lake Superior studies (ie. Nipigon Bay and Peninsula Harbour environmental studies).

MINISTRY OF THE ENVIRONMENT
ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE:

PROJECT NAME: Bay of Quinte - Inorganic and Organic Compounds

STARTING DATE: February 1983

PROJECT YEAR: 2

DURATION: 2

BRANCH/SECTION: Water Resources Branch
Great Lakes Section

PROJECT GROUP: Surveillance Unit,
Southeastern Region

OBJECTIVE: To examine the inorganic and organic contaminant conditions in the Bay of Quinte. The program is to investigate both sources and sinks as well as bioaccumulation.

BACKGROUND: Previous studies of contaminant sources and sinks in the Bay of Quinte as performed by federal and provincial agencies, have focused on inorganics. Much of the available information is either incomplete or out-of-date.

A comprehensive study of contaminants in the bay is essential from a drinking water supply perspective, as well as an increased recreational use perspective.

SCOPE: Identification of point sources of contaminants and recommendations for remedial programs. Assessment of need for future monitoring programs.

ASPECTS COMPLETED DURING PREVIOUS YEAR: Point source(s) and non-point source(s), mainly in the upper bay, were sampled seasonally. Sediment samples were collected at locations which showed elevated levels of inorganics and PCBs in a previous study (1972). In addition, macrophyte samples were collected in these areas to examine bioaccumulation.

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): None

EST. EFFORT/COST THIS FORECAST PERIOD		EST. LAB TEST LOAD		PEST:	
MAN-YEAR: 0.1	COST: \$ 5 K	WQ:	MICRO:	ITC:	OTC:
PROJECT LEADER: M. A. Zarull				TEL: 965-4590	

OUTPUT AND REMARKS: Update report to the Water Quality Board on Bay of Quinte contaminants. Recommendations for remedial measures.

MINISTRY OF THE ENVIRONMENT
ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE: 01 001 16 22

PROJECT NAME: Nanticoke
FILING DATE: February 1983 PROJECT YEAR: 15 DURATION: 15
BRANCH/SECTION: Water Resources Branch PROJECT GROUP: Surveillance Unit;
Great Lakes Section West-Central Region;
Ontario Hydro; MNR

OBJECTIVE: Maintain surveillance of the impact of increased industrial and municipal development on the nearshore zone at Nanticoke.

BACKGROUND: Large-scale industrial development (the Lake Erie Steel mill, Stelco Inc; refinery, Texaco Canada; thermal generating station, Ontario Hydro) is taking place in the coastal region around Nanticoke on Long Point Bay, Lake Erie. To protect water quality, chemical, biological and physical conditions have been monitored since 1968 by the Nanticoke Environmental Committee, representing MOE, MNR, Ontario Hydro, Stelco and Texaco. The monitoring will be completed this year.

SCOPE: Water quality and phytoplankton numbers and speciation will be monitored during the period April-November at 5 stations on a biweekly basis by MOE. The concentration of PAHs on Stelco's effluent and in Centre Creek will be determined. The effluent plume from Centre Creek, which serves as the outfall for Stelco, will also be traced by MOE. Fish and zooplankton studies will be carried out by MNR and water temperature monitoring by Ontario Hydro. A report summarizing the findings of the study for the period 1968-1978 is under preparation.

ASPECTS COMPLETED DURING PREVIOUS YEAR: Field studies; annual and summary reports on the individual studies (1968-1978).

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): Field studies will be completed this year. A report on the studies for the period 1978-1983 will be prepared in 1984/85.

EST. EFFORT/COST THIS FORECAST PERIOD	EST. LAB TEST LOAD	PEST:
MAN-YEAR: 0.2 COST: \$ 20 K	WQ: 900 MICRO:	ITC: 1000 OTC: 40

PROJECT LEADER: R. Weiler TEL: 965-4590

OUTPUT AND REMARKS: Ensure compliance with water quality objectives.

MINISTRY OF THE ENVIRONMENT
ONTARIO GREAT LAKES SURVEILLANCE PROGRAM

PROJECT FORECAST 1983/84

LIS PROGRAM CODE: 01 001 09 52

PROJECT NAME: Hamilton Harbour - a) Effect of Hamilton Harbour on nearshore Lake Ontario

FILING DATE: January 1983

PROJECT YEAR: 2

DURATION: 2

BRANCH/SECTION: Water Resources
Great Lakes Section

PROJECT GROUP: Surveillance Unit,
Investigation & Assessment Unit

OBJECTIVE: To investigate the extent of the plumes of Hamilton Harbour water emitted to the lake, the correlation between wind, currents, plume configuration and water quality in the extreme west end of the lake and the effect on water quality at the Hamilton and Burlington water intakes.

BACKGROUND: Spotty data exist on the harbour plume, its pollutant loading and its extent into the lake. No information is available on the effects of the plume on water quality at the intakes. Concern has been expressed about pollution of drinking water supplies by harbour water.

SCOPE: The field program in 82/83 consisted of: The configuration of the plume was measured seasonally in the period May-October, including wind, currents in the lake and the flux of harbour water out of the canal. Water quality variables, such as nutrients and trace contaminants were measured in the plume and at the intakes. The intake sampling program was continued during the winter months.

Sediment sampling will be done in 83/84 and analysed for trace contaminants and benthic fauna. The collected data will be analyzed for water quality effects outside the harbour and at the intakes. A report will be prepared, which will also include estimated loadings to the lake.

ASPECTS COMPLETED DURING PREVIOUS YEAR: Field program, except for sediment sampling, was completed in 82/83.

ASPECTS TO BE COMPLETED IN FOLLOWING YEAR(S): Final phase of project - data analysis and reporting - finished 83/84.

EST. EFFORT/COST THIS FORECAST PERIOD		EST. LAB TEST LOAD		PEST:	
MAN-YEAR: 0.3	COST: \$ 46 K	WQ:	MICRO:	ITC:	300 OTC:

PROJECT LEADER: D. Poulton, B. Kohl

TEL: 965-4590

OUTPUT AND REMARKS: Assessment of effect of Hamilton Harbour on the nearshore region of western Lake Ontario. Input to Water Quality Board (IJC) update on "Area of Concern". Further assessment of remedial programs for point source discharges to harbour.



Ministry
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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: July 1983

PROJECT TITLE:

Acidic Precipitation in Ontario Study

KEY WORDS:

Acidification, acidic precipitation, deposition, susceptibility

PRINCIPLE INVESTIGATOR

AND AFFILIATION

P.J. Dillon, Limnology Unit

LIAISON OFFICER

OR SUPERVISOR

K. Nicholls (Acting)

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT —

MULTI-YEAR PROJECT X

CATEGORY:

GRANT —

SOLICITED CONTRACT —

CONCURRENT PROJECT —

OBJECTIVE:

To quantify the physical, chemical and biological effects of acidic inputs to lakes. To construct models enabling prediction of effects

DESCRIPTION:

The intensive studies on the characterization of the effects of acidic inputs are being conducted on lakes in Muskoka-Haliburton. It involves a calibrated lake and watershed approach over many years. Predictive models will be developed and tested on these lakes and applied to other lakes in the Province.

DURATION
OF PROJECT

— YEARS

PRESENT
YEAR IS

5th

YEAR

REPORTING
DATE

BUDGET:

\$846,000

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

\$846,000

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY X
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Natural Resources

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: July 1983

PROJECT TITLE:

Phosphorus Removal Studies

KEY WORDS:

(1) Penetang-Midland; (2) Bay of Quinte; (3) Gravenhurst

PRINCIPLE INVESTIGATOR
AND AFFILIATION

G. Robinson, Limnology Section

LIAISON OFFICER
OR SUPERVISOR

K.H. Nicholls

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT <u>X</u>	MULTI-YEAR PROJECT <u>X</u>
CATEGORY:	GRANT —	SOLICITED CONTRACT —	CONCURRENT PROJECT —

OBJECTIVE:

To examine existing conditions in several highly enriched water bodies and then study the effects of reduced phosphorus loading through P control at local sewage treatment plants.

DESCRIPTION:

- (1) Penetang-Midland and Sturgeon Bay
 - 15 sites sampled bi-weekly from May to October
 - P-removal implemented at 4 S.T.P.'s in 1975, new plant to discharge to Sturgeon Bay in 1983.
- (2) Bay of Quinte - Water Resources Branch involvement terminated after 1982 (S.E. Regional Office will maintain sampling).
 - final report to be completed in 1983.
- (3) Gravenhurst
 - 1 site sampled bi-weekly from May to November
 - P-removal implemented at 1 S.T.P. in December 1971.
 - Plant effluent and receiving stream also sampled.

DURATION OF PROJECT	Ongoing YEARS	PRESENT (1) 12th YEAR IS (2) 12th (3) 15th YEAR	REPORTING (1) 1983 DATE (2) 1983 (3) 1983
BUDGET:		TOTAL DOLLARS (1) 18K TOTAL PROJECT CURRENT YEAR (2) 16K (3) 5K	MAN YEARS 0.2 TOTAL PROJECT CURRENT YEAR 0.2 0.1
SOURCE OF FUNDS:	REGULAR (3) WORK PROGRAM	SPECIAL (1) MINISTRY FUNDING	JOINTLY (2) FUNDED PROJECT OTHER —

IS A REPORT ANTICIPATED?

(1) Complete report (2) Complete report (3) Update since 1976

PARTICIPATION BY OTHER MINISTRIES:

(2) Co-operative project with Ministry of Natural Resources, Canada Centre for Inland Waters
Queens University and University of Guelph

REMARKS:

(1) Ministry of Natural Resources Participates in Sturgeon Bay Study.



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of the
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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: July 1983

PROJECT TITLE: (1) Urban Lakes: (2) Lake Restoration

KEY WORDS: (1) Urban lakes, stormwater impoundment; (2) Aeration, Destratification

PRINCIPLE INVESTIGATOR
AND AFFILIATION G. Robinson, Limnology SectionLIAISON OFFICER
OR SUPERVISOR K.H. Nicholls

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT <u>X</u>	MULTI-YEAR PROJECT <u>X</u>
CATEGORY:	GRANT —	SOLICITED CONTRACT —	CONCURRENT PROJECT —

OBJECTIVE:

- 1) To examine urban stormwater impoundments, identify existing and potential problem areas, and recommend solutions.
- 2) To improve water quality in small eutrophic lakes through the use of aeration and/or chemical inactivation techniques.

DESCRIPTION:

- 1) Lakes Aquitaine and Wabukayne - these two man-made lakes have been studied since they were constructed (1976-77).
 - there are distinct differences in sedimentation basin designs and watershed areas.
 - problem areas include: turbidity, road salt, Cladophora and floating debris.
- 2) Heart Lake has been destratified through aeration since 1975.

DURATION OF PROJECT	<u>Ongoing</u> YEARS	PRESENT (1) 7th YEAR IS (2) 9th YEAR	REPORTING (1) 1983 DATE
BUDGET:	TOTAL DOLLARS		MAN YEARS
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT CURRENT YEAR
	(1) 18K	(1) 0.1	(1) 0.1
	(2) 12K	(2) 0.1	(2) 0.1
SOURCE OF FUNDS:	REGULAR <u>X</u> WORK PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — OTHER — PROJECT

IS A REPORT ANTICIPATED? (1) Published in proceedings of Int. Symp. on Inland Waters and Lake Restoration (1981), MOE Data Report available July 1983. (2) Freshwat. Biol. 10:553-61

PARTICIPATION BY OTHER MINISTRIES:

Heart Lake Conservation Authority (M.T.R.C.A.) assists with compressors.

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: July 1983

PROJECT TITLE: Taxonomy and Ecology of Phytoplankton in Lake Acidification, Neutralization and Eutrophication Studies

KEY WORDS: Algae, Phytoplankton, Acidification, Eutrophication

PRINCIPLE INVESTIGATOR
AND AFFILIATION K.H. Nicholls, Limnology Section

LIAISON OFFICER
OR SUPERVISOR K.H. Nicholls (Acting)

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:
To describe structure and function of phytoplankton communities (taxonomy and ecology) relative to lake acidity and lake trophic state and effects of management strategies (e.g. P removal, CaCO₃ additions).

DESCRIPTION:
Muskoka-Haliburton

- 1) Study of several lakes relating composition and biomass of phytoplankton to other ecosystem variables (e.g. lake morphometry, water chemistry, food chain components).
- 2) Taxonomy of diatom frustules and Mallomonas scales in selected lake sediments (along with ²¹⁰Pb dating) to determine rate of lake acidification during past three centuries.
- 3) Factors controlling growth and odour production by Chrysochromulina breviturrita

Great Lakes

- 1) Response of phytoplankton to P loading reductions and long term changes related to nutrient loading, hydrology and climate (Bay of Quinte, south Georgian Bay, nearshore Great Lakes).

DURATION OF PROJECT	YEAPS	PRESENT YEAR IS	6 & 2 YEAR	REPORTING DATE	Significant findings reported as they arise
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		120K			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input checked="" type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER	1. APIOS 2. Great Lakes 3. Regular
IS A REPORT ANTICIPATED?	Several available, more in progress				

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Natural Resources, Dept. of Fisheries & Oceans, Queen's & Guelph Universities

REMARKS:

BRANCH: Water Resources

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DATE: July 1983

PROJECT TITLE:

Algal assay methods to determine toxicity of natural water in ecosystems.

KEY WORDS:

Toxicity, metals, organic compounds, algal assays

PRINCIPLE INVESTIGATOR

AND AFFILIATION

S.L. Wong, Plankton Taxonomy Unit

LIAISON OFFICER

OR SUPERVISOR

K.H. Nicholls, Limnology Section

RESEARCH

CATEGORY:

INTERNAL ☒
 GRANT ☐

UNSOLICITED CONTRACT ☐

SOLICITED CONTRACT ☒

MULTI-YEAR PROJECT ☐

CONCURRENT PROJECT ☐

OBJECTIVE:

To develop and apply assay techniques for evaluation of toxic effects of metals and organic contaminants on aquatic biota.

DESCRIPTION:

Algal assay techniques were developed to determine toxicity of natural waters that are stressed by organic and inorganic contaminants, for both hard and soft-water lakes.

DURATION
OF PROJECT

YEARS

PRESENT
YEAR IS

5 YEAR

REPORTING
DATE

As information
generated

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT CURRENT YEAR
(evaluated Annually)

MAN YEARS

TOTAL PROJECT CURRENT YEAR
1.0

SOURCE OF
FUNDS:

REGULAR :
WORK ☐
PROGRAM

SPECIAL ☒
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

The fourth report has been submitted to a scientific journal

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

The third report is under revision.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: September 1983

PROJECT TITLE:

"Filamentous Algae Programme"

KEY WORDS: Filamentous algae, Cladophora, monitor, nutrients, heavy metals, PCB's
Acidification, eutrophication

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Michael B. Jackson, Limnology Section

LIAISON OFFICER

OR SUPERVISOR

K.H. Nicholls, Limnology Section

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

- 1) To determine the effects of acidification on the distribution and abundance of filamentous algae in Ontario inland lakes.
- 2) To assess phosphorus control strategies for the Great Lakes relative to Cladophora growth requirements.
- 3) To apply filamentous algal tissue analysis to biomonitor long term trends in nearshore trace contaminants (nutrients, heavy metals, PCB's) in the Great Lakes and Ontario inland lakes.

DESCRIPTION:

- 1) Investigations of filamentous algae and controlling environmental factors, especially the role of pH in Ontario inland lakes and streams.
- 2) Monitoring Cladophora growth and environmental parameters in the Great Lakes in conjunction with I.J.C. lake-wide limnological investigations.
- 3) Surveillance of filamentous algal heavy metal, PCB & nutrient levels in the Great Lakes and Ontario inland lakes in cooperation with investigations by I.J.C. and other government agencies.

DURATION OF PROJECT	Ongoing	PRESENT YEAR IS	3	YEAR	REPORTING DATE	As information made available.
BUDGET:						
		TOTAL DOLLARS			MAN YEARS	
		TOTAL PROJECT	CURRENT YEAR 70K services & lab.		TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	X		JOINTLY FUNDED ——— PROJECT	OTHER ———

IS A REPORT ANTICIPATED?

Three available - other planned

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

Ministry
of the
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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources, Hydrology & Monitoring Section

DATE: July 26, 1983

PROJECT TITLE: Attenuation in Ground Water of Inorganic Contaminants from
Sanitary Landfills, Attenuation of Leachate.

KEY WORDS: Ground water; Landfills; Leachate; Attenuation

PRINCIPLE INVESTIGATOR J. A. Cherry, J. F. Barker, E.J. Reardon
AND AFFILIATION University of Waterloo

LIAISON OFFICER OR SUPERVISOR Dr. G. Hughes, Chief, Ground-Water Protection Unit

RESEARCH CATEGORY: INTERNAL X GRANT X UNSOLICITED CONTRACT X SOLICITED CONTRACT — MULTI-YEAR PROJECT X CONCURRENT PROJECT —

OBJECTIVE: The specific objectives of the proposed research are:

- (i) to determine the degree of attenuation of a large number of inorganic contaminants in shallow groundwater at a selected number of landfills situated on sandy unconfined aquifers and
- (ii) to develop an interpretive hydrogeological and hydrogeochemical framework to account for the observed patterns of contaminant attenuation. The ultimate aim of this research is to provide for an improved methodology for predicting the degree of attenuation that will occur at sandy sites at which new landfills may be proposed for development.

DESCRIPTION: A preliminary version of a hydrogeochemical and hydrodynamic framework to account for the attenuation of inorganic landfill-derived contaminants in sandy deposits was developed during a three-year investigation of an abandoned landfill at CFB Borden, Ontario. In this new research project, we intend to develop a more comprehensive methodology for attenuation prediction and to test the methodology by application to two sites that are much different than the Borden site. These sites are the major landfill that serves the city of North Bay and the Woolwich landfill, which serves the northern part of the Region of Waterloo. A detailed network of multi-level groundwater monitoring devices will be installed at each site and soil samples will be analyzed for parameters used in attenuation prediction. Detailed maps of contaminant concentrations in the ground water zone will be produced for comparison to predicted distributions.

DURATION OF PROJECT 3 YEARS PRESENT YEAR IS 3 YEAR REPORTING DATE 1984BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR
\$ 116,000

SOURCE OF FUNDING: REGULAR WORK PROGRAM JOINTLY FUNDED PROJECT MINISTRY FUNDING OTHER

IS A REPORT ANTICIPATED? Yes, Final Report

PARTICIPATION BY OTHER MINISTRIES: No

REMARKS:

Provincial Lottery Project 79-044-33



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources, Hydrology & Monitoring

DATE: July 20, 1983

PROJECT TITLE: Investigations of nitrate distribution and nitrogen transformations in a shallow, sandy aquifer near Alliston, Ontario.

KEY WORDS: Ground-water quality, nitrates, nitrogen transformation

PRINCIPLE INVESTIGATOR AND AFFILIATION R. W. Gillham, Dept. of Earth Sciences
University of Waterloo

LIAISON OFFICER OR SUPERVISOR Dr. G. Hughes, Chief, Ground Water Protection Unit
Hydrology & Monitoring Section

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT <u>X</u>	MULTI-YEAR PROJECT <u>X</u>
CATEGORY:	GRANT <u>X</u>	SOLICITED CONTRACT <u>—</u>	CONCURRENT PROJECT <u>—</u>

OBJECTIVE: To characterize the nitrate distribution in a shallow sand aquifer near Alliston, Ontario, to evaluate factors controlling the occurrence of denitrification in the aquifer, and to develop alternate ground-water development methods that would alleviate the existing contamination problem in domestic wells.

DESCRIPTION:

A recent survey by Dr. A. K. Hill of York University has shown extensive nitrate contamination of domestic wells located in a shallow aquifer near Alliston, Ontario. Based on previous studies conducted at the University of Waterloo, it is probably that as a result of denitrification, the zone of contamination extends for a relatively shallow depth below the water table. Field studies will be conducted to evaluate the extent of the contaminated zone, to develop alternate groundwater development procedures and to determine the hydrogeochemical controls on the denitrification process.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	Sept. 30, 1985
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$ 141,105	\$ 55,000		

SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	OTHER <u>X</u>
	WORK <u>—</u>	MINISTRY <u>—</u>	FUNDED <u>—</u>	
Provincial Lottery	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED? Yes. Final Report

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:

Provincial Lottery Project No. 62



RESEARCH AND DEVELOPMENT INVENTORY

RANCH: Water Resources, Hydrology & Monitoring Section

DATE: July 20, 1983

PROJECT TITLE: Design of Ground-Water Monitoring Programs
for Waste Landfill Sites.

KEY WORDS: Ground-water quality monitoring; Landfills

PRINCIPLE INVESTIGATOR Dr. P. Byers & R. Schwartz
AND AFFILIATION Dept. of Civil Engineering, University of Toronto

LIAISON OFFICER I. Pawlowski, Ground-Water Protection Unit,
OR SUPERVISOR Hydrology & Monitoring Section

RESEARCH	INTERNAL <input checked="" type="checkbox"/>	UNSOLICITED CONTRACT <input checked="" type="checkbox"/>	MULTI-YEAR PROJECT <input checked="" type="checkbox"/>
CATEGORY:	GRANT <input type="checkbox"/>	SOLICITED CONTRACT <input type="checkbox"/>	CONCURRENT PROJECT <input type="checkbox"/>

OBJECTIVE: Evaluation of the applicability of statistical methods, simulation techniques and models in the field of environmental monitoring of ground-water quality at various landfills sites.

DESCRIPTION:

To assess the suitability of statistical methods and models through a literature review, analysis of data available to the Ministry of the Environment from two monitored landfill sites, and to apply the most suitable simulation techniques and statistical methods to the design of ground-water quality monitoring programs for landfill sites.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	March 31, 1985
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$ 30,000	\$ 20,000		

SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	OTHER <input checked="" type="checkbox"/>
	WORK <input type="checkbox"/>	MINISTRY <input type="checkbox"/>	FUNDED <input type="checkbox"/>	
	PROGRAM	FUNDING	PROJECT	
	Prov. Lot. Trust Fund			

IS A REPORT ANTICIPATED? Yes. Final Report due March 31, 1985

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS: Provincial Lottery Project. RAC Project #63



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources, Hydrology & Monitoring Section

DATE: July 20, 1983

PROJECT TITLE:

Field Measurement of Infiltration Through Landfill Covers

KEY WORDS: Ground-water, Infiltration; Landfill Covers

PRINCIPLE INVESTIGATOR AND AFFILIATION P. K. Lee
Gartner Lee Associates Ltd.

LIAISON OFFICER OR SUPERVISOR Dr. G. M. Hughes, Chief
Ground Water Protection Unit, Hydrology & Monitoring Section

RESEARCH External ☒ INTERNAL ☐ UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒
CATEGORY: GRANT ☐ SOLICITED CONTRACT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

To collect field measurements of the actual amount of water that infiltrates through various types of covers under various conditions at landfill sites. The data collected will be tested for reproducibility and compared to the results expected using the empirical calculations of infiltration obtained from other disciplines.

DESCRIPTION:

Through a program of close liaison with the MOE and other regulatory and research bodies, 3 prototype lysimeter systems will be designed and constructed. These systems will be monitored for 12 months and the data analyzed and checked for consistency. Additional lysimeter systems incorporating various cover materials and physical settings will then be constructed and monitored. A complete analysis and assessment of the results will be undertaken.

DURATION OF PROJECT 2 YEARS PRESENT YEAR IS 2 YEAR REPORTING DATE March 31, 1984

BUDGET: TOTAL DOLLARS TOTAL PROJECT \$ 100,000 CURRENT YEAR \$ 29,720 MAN YEARS TOTAL PROJECT 3 CURRENT YEAR 2

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER ☒

IS A REPORT ANTICIPATED? Yes. Interim and final

PARTICIPATION BY OTHER MINISTRIES:

NIL

REMARKS:

Provincial Lottery Project 82-058-32



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources, Hydrology & Monitoring Section DATE: July 20, 1983

PROJECT TITLE: Acidic ground-water supplies in private, domestic wells.

KEY WORDS: Ground water: Acidification

PRINCIPLE INVESTIGATOR AND AFFILIATION: Joe Lye, APIOS

LIAISON OFFICER OR SUPERVISOR: U. Sibul, Acting Supervisor, Hydrology & Monitoring Section

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To determine the occurrence and distribution of low pH ground waters in northern Ontario and to determine the suitability of these waters for private, domestic (drinking) purposes.

DESCRIPTION: Main phases of work being undertaken are:

- . to determine the occurrence and distribution of acidic (low pH) ground waters in areas sensitive to acidic precipitation;
- . to determine the reason(s) for this acidity;
- . to determine the inorganic quality of these waters, including trace metals content;
- . to investigate the leaching of trace metals from domestic plumbing systems by low pH ground water and to relate these results to drinking water criteria.

DURATION OF PROJECT	<u>On-going</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		<u>≈ \$ 10,000</u>		<u>1/2</u>	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<u>X</u>	SPECIAL MINISTRY FUNDING	<u>X</u>	JOINTLY FUNDED PROJECT
					OTHER <u>—</u>
IS A REPORT ANTICIPATED?	<u>Annual summary reports</u>				
PARTICIPATION BY OTHER MINISTRIES:					
REMARKS:					

PANCH: Water Resources, Hydrology & Monitoring

DATE: July 20, 1983

PROJECT TITLE: Acidic precipitation and ground-water quality in the APIOS and calibrated watersheds.

KEY WORDS: Ground water; Acidification; APIOS

PRINCIPLE INVESTIGATOR AND AFFILIATION Joe Lye, APIOS

LIAISON OFFICER R SUPERVISOR U. Sibul, Acting Supervisor, Hydrology & Monitoring Section

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To determine the effects of acid rain on ground-water quality and to assess the effects of ground-water quality on stream quality in the Ministry's calibrated watershed in the Muskoka-Haliburton area:

DESCRIPTION:

Specific research being undertaken are:

- . to determine the effects of low pH precipitation on ground-water pH values in various geologic settings by extensive sampling of ground water and by continuously monitoring ground-water pHs in order to relate to precipitation events;
- . to determine suitable methods of streamflow hydrograph separation applicable in the calibrated watersheds;
- . to assess the effect of ground-water quality on stream quality by relating quality of known ground-water discharges to stream quality.

DURATION OF PROJECT	On-going	YEARS	PRESENT YEAR IS	3	YEAR	REPORTING DATE	Annual
BUDGET:	TOTAL DOLLARS			MAN YEARS			
	TOTAL PROJECT		CURRENT YEAR		TOTAL PROJECT		CURRENT YEAR
			≈ \$ 20,000				1/2
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	<input checked="" type="checkbox"/>	JOINTLY FUNDED PROJECT	<input type="checkbox"/>	OTHER <input type="checkbox"/>
IS A REPORT ANTICIPATED?	Annual summary reports						
PARTICIPATION BY OTHER MINISTRIES:							

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: November 1983

PROJECT TITLE: Evaluation and Testing of Exposure Analysis Modelling System (EXAMS).

KEY WORDS: Model, exposure, fate, trace contaminant, aquatic systems.

PRINCIPLE INVESTIGATOR AND AFFILIATION K. Willson, River Systems Unit, Water Resources.

LIAISON OFFICER OR SUPERVISOR D.G. Weatherbe, Head River Systems Unit, Water Resources Br.

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To set up, test and evaluate the usefulness of EXAMS model in investigating the degradation and environmental fate of organic contaminants including pesticides.

DESCRIPTION: EXAMS is an interactive modelling system for analyzing exposure, fate, distribution and persistence of organic trace contaminants in aquatic ecosystems. This model, which was developed by EPA, will be tested and evaluated using hypothetical cases of data from U.S. and Canadian sources. Simulation runs will be made to better define model capabilities, parameter values and management usefulness as a tool for achieving water quality goals.

DURATION OF PROJECT 1 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE March 31/84.

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$3000.00	\$1000.00	.25	.25
SOURCE OF FUNDS:	REGULAR <u>X</u> WORK PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —

IS A REPORT ANTICIPATED? Yes.

PARTICIPATION BY OTHER MINISTRIES: No.

REMARKS: Future phases depend on usefulness of the model.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources Branch

DATE: 21 November 1983.

PROJECT TITLE: Determination of Volatilization Rates of Organic Compounds of Public Health Concern

KEY WORDS: Volatilization, spills, organics, Grand River

PRINCIPLE INVESTIGATOR
AND AFFILIATION Gore & Storrie Ltd., Dr. T.P.H. Gowda

LIAISON OFFICER
OR SUPERVISOR Dennis D. Draper

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ~~X~~ MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT

OBJECTIVE:
For specified priority organic substances, to determine rates of volatilization from specified sites in the Grand River basin and to establish general procedures/programs for other substances, based on molecular structure.

DESCRIPTION:
Several river reaches in the Grand River have been previously investigated to directly measure their rate of atmospheric re-oxygenation. Data from these studies will be re-examined to determine rates at which organic compounds would be volatilized. In addition to field data analysis, the volatilization rate determination involves determining Henry's constant for each compound, and whether liquid film or gas film diffusion controls. An evaluation will be done for most of the substances specified in the Ministry's Hazardous Contaminants list of Chemicals for Further Evaluation and additionally for several pesticides and priority potential contaminants in drinking water.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	March 31, 1984.
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$24100.00	24100.00			
SOURCE OF FUNDS: Provincial Lottery	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes.

PARTICIPATION BY OTHER MINISTRIES:
Air Resources Branch: Technical Liaison

REMARKS: Results of this project will be valuable input to evaluate other models for toxic contaminants being tested by this Branch.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources.

DATE: 21 November 1983.

PROJECT TITLE: Ottawa River Nuclear Spill Contingency Model Development

KEY WORDS: Tritium, contingency, Ottawa River, 2-D Model

PRINCIPLE INVESTIGATOR
AND AFFILIATION T.P.H. Gowda , Gore & Storrie Ltd.

LIAISON OFFICER
OR SUPERVISOR Dennis D. Draper

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE: To develop a 2-dimensional river model for finite-time released pollutants, with immediate application to the Ottawa River for accidental nuclear spill contingency planning.

DESCRIPTION:

This project is an extension of previous work in which a 1-D finite-time release model was developed for application to the Ottawa River. The present project will develop a 2-dimensional model, in order that the impact of accidentally spilled material on water intakes on both shores of the Ottawa River may be more accurately defined within the mixing zone. An evaluation of the importance of the convective period, during which a spilled pollutant is non-Gaussian in distribution in the river, will also be carried out. Finally, methods will be described for linking near-field and far-field dispersion models.

DURATION OF PROJECT 1 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE March 31, 1984.

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	19380.00	19380.00		
SOURCE OF FUNDS:	REGULAR WORK ———	SPECIAL MINISTRY <u>X</u> FUNDING	JOINTLY FUNDED ———	OTHER ———
	PROVINCIAL Lottery PROGRAM		PROJECT	

IS A REPORT ANTICIPATED?

Yes.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Client is MOE Southeastern Region (Kingston) with whom the model will reside following testing and verification by Water Resources Branch.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources.

DATE: November 1983.

PROJECT TITLE:

Contaminants in Sediments in the Humber River

KEY WORDS:

Sediment Transport, Heavy Metals, Suspended Sediment, Contaminant Movement

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Stephan Klose, Metropolitan Toronto and Region Conservation Authority
(MTRCA).

LIAISON OFFICER
OR SUPERVISOR

Brian Whitehead

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT X MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To define and evaluate sediment transport as a mechanism for contaminant movement in the Don and Humber Rivers.

DESCRIPTION: The relationship between selected heavy metals and suspended sediment will be investigated using historical data from provincial water quality stations in the Don River basin. Field centrifugation studies in the Don and Humber basins will be carried out to characterize pollutant concentrations on suspended sediments. The Humber River channel geometry will be established and the sediment distribution in the Humber system will be mapped. Fine sediments will be characterized by particle size distribution and chemical analysis of the particle fractions. Finally, the sediment transport and deposition capabilities in the river system will be analysed through use of sediment transport models.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

2 YEAR

REPORTING
DATE

March 1984.

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT
\$48K

CURRENT YEAR
\$40K

MAN YEARS

TOTAL PROJECT
1.5

CURRENT YEAR
1.25

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY X
FUNDING TAWMS

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Work is jointly carried out by MTRCA and MOE staff. General direction of the work comes from the Water Quality Committee of the Toronto Area Watershed Management Strategy Study.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: 22 November 1983.

PROJECT TITLE: Acid Precipitation in Ontario Study - Hydrologic Modelling for Chemical Budgets

KEY WORDS: Modelling, prediction, snowmelt, watershed acid rain

PRINCIPLE INVESTIGATOR AND AFFILIATION H. Belore, Cumming, Cockburn and Assoc.

LIAISON OFFICER OR SUPERVISOR Dr. L.A. Logan

RESEARCH CATEGORY: X INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT X
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE: To develop, evaluate and apply hydrologic models-watershed, snowmelt and statistical- in estimating and predicting snowmelt volume, melt rate and watershed runoff as input to chemical budget and flux analysis, as tools in investigating aquatic systems affected by acid rain.

DESCRIPTION: Suitable watershed models (eg.TVA) have been evaluated and interfaced with locally derived snowmelt models. The watershed model is physically based, having empirically derived equations to represent the movements of moisture from input of precipitation through the watershed to the lakes. The snowmelt model is based on temperature-index of rainfall and average daily temperature; which is locally calibrated. A statitically-based chain-of-lake model is developed to estimate local runoff and to simulate movement of flow through the streams and lake systems.

DURATION OF PROJECT	5 YEARS	PRESENT YEAR IS	3 YEAR	REPORTING DATE	Annual
BUDGET: \$100K	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS: APIOS	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING X	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes, annual reports.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Research groups in other branches in the Ministry are participating jointly in the APIOS program, investigating different aspects of the program.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: 22 November 1983.

PROJECT TITLE:

Waste Load Assimilation and Risk Assessment.

KEY WORDS:

Water quality, assimilation, criteria, risk.

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. L.A. Logan, Chief Hydrologics

LIAISON OFFICER
OR SUPERVISOR

D.G. Weatherbe, Head, River Systems Unit.

RESEARCH X
CATEGORY:

INTERNAL ~~X~~
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT ~~X~~
CONCURRENT PROJECT —

OBJECTIVE: Establish performance criteria (reliability/resiliency/ vulnerability) in wasteload assimilation and to assess risk of failure associated with water quality parameters to provide a basis in establishing Ministry's PWQO Guidelines and policies.

DESCRIPTION: Wasteload assimilation:

Probability techniques are used to establish and set-up suitable criteria for reliability of decisions based on frequency failure, resiliency-(ie. how quickly the system recovers) and vulnerability (how severe are the consequences of failure). The analysis is expanded to consider risk of failure of specified water quality parameters using the Bayes Risk concept. This approach adds input to the decision-making process.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Annual</u>
BUDGET:	In-house	TOTAL DOLLARS		MAN YEARS	
		TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
				1	.25
SOURCE OF FUNDS:	/	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —
IS A REPORT ANTICIPATED?					
Yes.					
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

Part of in-house activities associated with on-going projects.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Manganese Removal from Surface Water

KEY WORDS:

Drinking water, manganese

PRINCIPLE INVESTIGATOR

AND AFFILIATION

G. Martin

LIAISON OFFICER

OR SUPERVISOR

A. Oda

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐

CATEGORY:

GRANT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To study various coagulation/filtration techniques for effectiveness in removing manganese from surface waters.

To study the use of ozone for colour removal in iron- and manganese-bearing waters.

DESCRIPTION:

Pilot plants including upflow clarifier and filters will be set up to investigate manganese removal by the high lime/ferric chloride process. Proprietary filters such as Durcon electromedia, manganese greensand will also be investigated.

Raw water conditions involving high colour and taste and odour are encountered also.

Ozone treatment will be evaluated for the effectiveness in reducing colour levels in manganese-laden waters.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>final</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$11,500	\$1500	0.9	0.05	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

Interim report available



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Ozonation of Potable Water Supplies

KEY WORDS:

Ozone, potable water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

A. Oda - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒ X
GRANT ☐

UNSOLICITED CONTRACT ☐
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐
CONCURRENT PROJECT ☐

OBJECTIVE:

To investigate the use of ozone in potable water treatment

DESCRIPTION:

Laboratory bench scale and pilot plant studies of ozonation as applied to potable water treatment. Special attention will be paid to coloured waters with low turbidity with emphasis placed on the use of ozone as an alternate disinfectant to avoid chlorinated by-products.

DURATION OF PROJECT	Continuing	YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE	March/84
BUDGET:	TOTAL DOLLARS		MAN YEARS			
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR		
	Cont.	\$8,000	Cont.	0.15		
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> X PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>		
IS A REPORT ANTICIPATED?	Yes; in-house documents available to municipalities as each investigation is completed					
PARTICIPATION BY OTHER MINISTRIES:						

REMARKS:

This is an on-going area of study.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services and Applied Research Branch

DATE: December/83

PROJECT TITLE: Corrosion Indices

KEY WORDS: Corrosion, Aggressive Water, Langeliers Index, Alkalinity

PRINCIPLE INVESTIGATOR
AND AFFILIATION R.B. Hunsinger and H.J. Graham

LIAISON OFFICER
OR SUPERVISOR K.J. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To determine the optimum index of corrosion for use in Ontario water for prediction of aggressive water.

DESCRIPTION: Following distribution system investigations with associated chemistry and macro/microbiological analyses an index is to be developed to predict aggressive waters for Ontario municipally (and other) treated drinking waters.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>final</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	10K	10K	0.2	0.2	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: -preliminary development of concept for presentation at National Association of Corrosion Engineers Conference. 1984.



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Asbestos Cement (A/C) Pipe Corrosion

KEY WORDS:

Drinking waters, asbestos, corrosion

PRINCIPLE INVESTIGATOR
AND AFFILIATION

R. Hunsinger

LIAISON OFFICER
OR SUPERVISOR

K. Roberts

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To investigate through surveys, the magnitude of asbestos concentrations in distribution systems utilizing A/C pipe in aggressive water situations.

DESCRIPTION:

Samples will be taken from municipalities identified as having A/C pipe and aggressive treated water. The A/C pipe manufacturers recommend a modified Langelier Index be the criteria to determine where A/C pipe be used/not used.

Where necessary treatment suggestions (soda ash addition, lime etc.) will be made to alleviate the aggressive condition and to avoid possible problems of asbestos pick-up in the distribution system.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>final</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$25K	\$5K	0.6	0.15	
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
IS A REPORT ANTICIPATED?	Yes				

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Asbestos in Potable Water Supplies

KEY WORDS:

Asbestos, potable water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

R.B. Hunsinger - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To survey asbestos levels in raw water and treated potable water throughout Ontario.

DESCRIPTION:

Raw and potable water supplies throughout Ontario will be surveyed for asbestos levels. The data will be tabulated with raw water type, water treatment plant process and finished water quality. This is essentially an on-going project which monitors asbestos levels.

DURATION OF PROJECT	_____ YEARS	PRESENT YEAR IS	8th _____ YEAR	REPORTING DATE	_____ 1984
BUDGET:	TOTAL DOLLARS			MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
	\$128K	\$10K		3.5	0.3
SOURCE OF FUNDS:	REGULAR WORK _____ PROGRAM	SPECIAL MINISTRY _____ FUNDING		JOINTLY FUNDED _____ PROJECT	OTHER _____

IS A REPORT ANTICIPATED?

Yes - MOE Green Bound

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

-man years includes Regional MOE personnel



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Retention Time Tracer Studies in Pilot and Full Scale Water Treatment Plants

KEY WORDS:

Water Plant, Tracer, Retention Time

PRINCIPLE INVESTIGATOR

AND AFFILIATION

R.B. Hunsinger, G. Martin, G. Luck

LIAISON OFFICER

OR SUPERVISOR

K.J. Roberts

RESEARCH

CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To develop a practical method for the determination of retention time in the various unit processes in a drinking water plant by the use of chemical tracers.

DESCRIPTION:

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$15,000	\$5,000	.3	0.1	
SOURCE OF FUNDS:	REGULAR <u>X</u> WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

-carried out by Experience 82/83 students
-report anticipated early 1984



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE: Drinking Water Monitoring Program

KEY WORDS: Drinking Water, Monitoring, Contaminants Trends, Analysis

PRINCIPLE INVESTIGATOR
AND AFFILIATION R.B. Hunsinger

LIAISON OFFICER
OR SUPERVISOR K.Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:
To develop and operate a centrally controlled data base for 40 objective parameters and 70 research parameters in drinking water.

DESCRIPTION:
The data base will exercise a high degree of quality control over data in sampling and analysis and will provide:
-a definition of contaminant levels and trends
-a flagging system for exceedence of "objectives"
-a comprehensive basis for any needed remedial action
-immediate, reliable, and current information thus avoiding unnecessary "brush fire" sampling and analysis
-mechanism for minimizing sampling requirements
-framework for assessment of new contaminants as they arise
-an audit of sampling and analytical methodology

DURATION OF PROJECT	ongoing YEARS	PRESENT YEAR IS		1 YEAR	REPORTING DATE	
		1985	1985			
L ET:						
		TOTAL DOLLARS		MAN YEARS		
		TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		-	\$85,000	-	1.0	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	<input type="checkbox"/>	JOINTLY FUNDED PROJECT	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED: Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Manganese Sequestration

KEY WORDS:

Manganese, Potable Water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

F.J. Dart - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To control manganese in water supplies

DESCRIPTION:

Control of manganese by sequestration techniques involving sodium silicate or hydrogen peroxide addition to the raw water will be studied and further optimized. The very effective sequestration of excess manganese by silicate is frequently frustrated by the usually slow and basically unpredictable rate of manganese oxidation for its capture by the silicate. The oxidizability of raw water manganese varies from "quickly oxidized by combined chlorine residuals" to "barely affected by generous free chlorine or chlorine dioxide additions".

Presently the peroxide procedure for manganese seems to be limited in practise to about 0.3 mg/L manganese. Strong rechlorination uses by customers in laundry and swimming pools can still create problems with higher manganese contents.

DURATION OF PROJECT	<u>Continuing</u> YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE
BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	<u>Continuing</u>	\$5K		0.15
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes; in house documents re each investigation			
PARTICIPATION BY OTHER MINISTRIES:				

REMARKS:

This is an on-going study since each new manganese control situation could present a unique treatment requirement.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Iron Sequestration

KEY WORDS:

Iron, Potable Water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

F.J. Dart - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒ —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To improve control of iron in water supplies

DESCRIPTION:

Control of iron through addition of sodium silicate may be improved in water supplies in terms of extended stability, a broadened range of treatment effectiveness, and increased chemical efficiency. A newly developed procedure for preserving the unique chemical properties of fresh natural well waters for study back at the laboratory can now be utilized.

DURATION OF PROJECT	Continuing YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE	as each study completed
BUDGET:	TOTAL DOLLARS			MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
	Continuing	\$5K		Continuing	0.15
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING		JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

This on-going study takes additional advantage of actual water supply difficulties as they arise for the unique insight they can help provide.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Unorthodox filters for small municipal drinking water systems

KEY WORDS:

filtration, drinking water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

H.J. Graham - Environmental Technology

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐
CONCURRENT PROJECT ☐

OBJECTIVE:

To study the suitability and performance of relatively inexpensive water filtration devices that may be used for the production of drinking water in small municipalities.

DESCRIPTION:

Test various filtration devices, including cartridge filters and backwashable fabric filters, in field tests on appropriate raw water sources. Also investigated will be natural systems such as bank filtration. Analysis of samples (chemical, microbiological and macrobiological) before and after the filters will determine treated water quality and the effectiveness of the filters. Information will also be gathered on operational problems.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

1 YEAR

REPORTING
DATE

1984

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

\$35,000

CURRENT YEAR

\$15,000

MAN YEARS

TOTAL PROJECT

0.7

CURRENT YEAR

0.3

SOURCE OF
FUNDS:

REGULAR ☒
WORK ☐
PROGRAM

SPECIAL ☐
MINISTRY ☐
FUNDING

JOINTLY ☐
FUNDED ☐
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Experience '83 and '84 students will be used to do much of the field work.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

A survey of water quality in distribution systems

KEY WORDS:

Water quality, Distribution systems, Drinking water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

H.J. Graham & R.B. Hunsinger - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K.J. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To examine drinking water distribution systems for water quality changes in various health and aesthetic related parameters.

DESCRIPTION:

To examine in detail the water quality in the treatment plant and the distribution system of selected municipalities. Parameters examined will include general chemistry, micro and macro-organisms, heavy metals and asbestos. Special in-depth surveys may be required to determine the extent of heavy metals released from home plumbing in areas of corrosive water.

DURATION OF PROJECT	<u>2-3</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Interim reports</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$44,000	\$15,000	3.0	0.2	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes - Individual municipal reports				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

Thus far 33 locations have been examined and reports have been written on 17 of these. "Experience" students will be used to conduct the field work.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Trihalomethane Levels in Ontario Drinking Waters

KEY WORDS:

Organics, potable water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

G. Martin and G. Luck

LIAISON OFFICER
OR SUPERVISOR

K. Roberts

RESEARCH
CATEGORY:

INTERNAL X
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To survey and monitor trihalomethane compounds in raw and treated water supplies in Ontario.

DESCRIPTION:

Samples from water treatment plants throughout the province will be examined for trihalomethanes, particularly those chlorinated organics produced during treatment. The various treatments will be correlated with the occurrence of trace organic contaminants in the finished water.

DURATION OF PROJECT	_____ YEARS	PRESENT YEAR IS	6 _____ YEAR	REPORTING DATE	1983 _____
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$200K	\$3K	6	0.10	
SOURCE OF FUNDS:	REGULAR WORK _____ PROGRAM	SPECIAL MINISTRY _____ FUNDING	JOINTLY FUNDED _____ PROJECT	OTHER _____	

IS A REPORT ANTICIPATED? Yes, MOE Green Cover

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

- a draft of this report is currently circulating for comment.
- essentially an on-going project which will be handled by MOE regions following report publications
- the report is a joint venture with Laboratory Services Branch



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

The Occurrence of *Yersinia enterocolitica* in Selected Raw and Treated Drinking Waters in Ontario

KEY WORDS:

Yersinia enterocolitica, Drinking Water

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Ann H. Vajdic

LIAISON OFFICER
OR SUPERVISOR

Ann H. Vajdic

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To determine the frequency of occurrence of *Yersinia enterocolitica* in raw and treated municipal water supplies, using P-A and M-F cultures.

DESCRIPTION:

P-A and M-F cultures, after routine analysis for coliforms and other indicator bacteria has been completed, will be examined for the presence of *Yersinia enterocolitica* using established isolation techniques. All Gram negative isolates will be screened biochemically for characteristics typical of *Yersinia* species, and final identification will be completed on the API 20E system.

Isolates identified as *Yersinia enterocolitica* will be forwarded to the Ministry of Health, Environmental Bacteriology laboratory for final confirmation and virulence testing.

DURATION OF PROJECT	<u>1</u>	YEARS	PRESENT YEAR IS	<u>2nd</u>	YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS				MAN YEARS		
	TOTAL PROJECT		CURRENT YEAR		TOTAL PROJECT		CURRENT YEAR
	\$36K				1.35		
SOURCE OF FUNDS:	REGULAR WORK <u>X</u>		SPECIAL MINISTRY <u> </u>		JOINTLY FUNDED <u> </u>		OTHER <u> </u>
	PROGRAM		FUNDING		PROJECT		

IS A REPORT ANTICIPATED?

Yes, MOE Green Cover

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

This report has been circulated for review, and is now in the final stages of publication.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Organic removal at the Niagara Falls Water Treatment Plant

KEY WORDS:

Water Treatment, Organics, Sampling, Jar Tests

PRINCIPLE INVESTIGATOR
AND AFFILIATION

R. Hunsinger, G. Martin

LIAISON OFFICER
OR SUPERVISOR

K. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒ —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

To optimize the Niagara Falls Water Treatment process for organic removal with minimum changes to the processes.

DESCRIPTION:

A sampling program will be set up to properly examine organics. This will involve calculation of plug flow, experimental determination of actual flow and sampling point location. Jar testing will be carried out to examine optimum dosages and chemical, examining both organics and inorganic parameters. Optimized condition of dosage and chemical will then be instituted on a plant scale.

DURATION
OF PROJECT

1 — YEARS

PRESENT
YEAR IS

1 — YEAR

REPORTING
DATE

1983

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT
\$33,000

CURRENT YEAR

MAN YEARS

TOTAL PROJECT 0.9
CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR ☒
WORK —
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

Report completed, March, 1983



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Trace Organic Contaminant Removal from Drinking Water

KEY WORDS:

Drinking water, organics

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Contractor to be chosen by Jan/84

LIAISON OFFICER
OR SUPERVISOR

K. Roberts, MOE

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT X

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

1. To assess the effectiveness of optimized conventional drinking water treatment for the removal of trace organic contaminants
2. To assess the effectiveness of activated carbon adsorption removals of trace organic contaminants when used in add-on contactor mode
3. To determine process operational parameters

DESCRIPTION:

Pilot plant studies will be carried out using a natural water source e.g. The Niagara River, containing a consistent range of low level organic contaminants. The study will take place over a time frame to include the four seasons of the year. There will be essentially two phases: the first being literature review and analytical and sampling protocol development; the second involving experimental design and physical design and equipment set up together with bench scale and pilot plant experimental investigations

DURATION OF PROJECT	<u>2 1/2-3</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>estimated mid 1986</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT 1M	CURRENT YEAR 200K	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY <u>RAC</u> FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
IS A REPORT ANTICIPATED?	Yes				

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Participation in program by Health and Welfare Canada; Environment Canada
are observers



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE: Magnetic Treatment in Water Purification

KEY WORDS: Drinking water, hardness, magnetism

PRINCIPLE INVESTIGATOR AND AFFILIATION D.E. Wemyss, F.J. Dart; Water Technology Section

LIAISON OFFICER OR SUPERVISOR K. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To carry out a feasibility study which will define the magnetic water treatment process and its limitations

DESCRIPTION:

The investigation will involve specific control of the geometrical and mechanical aspects of the treatment process; equipment with the ability to vary process parameters will be used.

Accurate and consistent measurements will be made of the minutest changes in specifically chosen parameters. The determinations will be made before and after the magnetic treatment of high iron, variable hardness water.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$10,000	\$5,000	0.3	0.15	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE:

Trace Contaminants in Water Treatment Plant Chemicals

KEY WORDS:

Trace contaminants, chemicals

PRINCIPLE INVESTIGATOR
AND AFFILIATION

D.E. Wemyss - Water Technology Section

LIAISON OFFICER
OR SUPERVISOR

K. Roberts

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To examine chemicals used in the potable water treatment process, by both physical and chemical analytical methods, for trace contaminants

DESCRIPTION:

Water treatment plant chemicals will be sampled and subjected to chemical and physical analyses for constituents with special emphasis being placed on trace contaminants.

In addition, raw chemicals and production processes at the manufacturing level will be checked for any variation in manufacturing techniques or precursor materials that might affect the quality of the products. The results will have probable significance in the water industry specifications for chemicals used in process or as additives.

DURATION OF PROJECT	<u>2.5</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$63K	\$33K	3	0.05	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes - MOE Green Cover				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

Report in draft form Dec/83



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: HAZARDOUS CONTAMINANTS AND STANDARDS

DATE:

PROJECT TITLE:

Protocol for the assessment of the safety of additives and materials in contact with potable water

KEY WORDS:

Drinking water, potable water, additives, assessment

PRINCIPLE INVESTIGATOR
AND AFFILIATION

LIAISON OFFICER
OR SUPERVISOR

Mr. G.A. Missingham

RESEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

Develop a protocol for the assessment of the safety of additives and materials in contact with potable water. Using this protocol evaluate compounds as identified by the Ontario Ministry of the Environment.

DESCRIPTION:

There are no official testing requirements for evaluating the suitability of water treatment chemicals, paints, coatings or linings in contact with potable water. The Federal Government **in the past has evaluated chemicals for use in water treatment.** No specific testing protocols have been established in Canada, although other countries have developed protocols of varying complexity. Authorities responsible for maintaining water quality, must therefore take an active interest in the effect of all these materials on the quality of water in which they come in contact.

DURATION OF PROJECT	1 ——— YEARS	PRESENT YEAR IS	1983 ——— YEAR	REPORTING DATE	by April 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	75,000	75,000			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ———	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					
No					
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

West Central Region

DATE:

November 10, 1983

PROJECT TITLE:

Storm Water Management Model for Hamilton Harbour
Hamilton Urban Runoff Studies

KEY WORDS:

Urban Runoff, Urban runoff modelling, wet weather, & dry weather loadings.

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. William James, Computational Hydraulics Incorporated

LIAISON OFFICER

OR SUPERVISOR

presently J. R. Mayes

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT —

MULTI-YEAR PROJECT —X—

CATEGORY:

GRANT —

SOLICITED CONTRACT —

CONCURRENT PROJECT —

OBJECTIVE:

To develop a model to predict the quality and quantity of storm runoff discharging to Hamilton's receiving waters.

DESCRIPTION:

Collection of water samples from various points in the sewer system, chemical analysis, various parameters including nutrients in water samples. Develop loading estimates using comprehensive modelling techniques.

Rain fall, flow and water quality measuring devices, some of which are controlled by micro computers, are sampled periodically during dry weather and intensively during wet weather conditions.

DURATION
OF PROJECT

—4— YEARS

PRESENT

YEAR IS

—4— YEAR

REPORTING

DATE

Annually

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

100,000

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

5

5

SOURCE OF
FUND:

REGULAR

WORK —

PROGRAM

SPECIAL

MINISTRY —X—

FUNDING

JOINTLY

FUNDED —

PROJECT

OTHER —X—

Experience program

IS A RELIEF ANTICIPATED?

Yes, February, 1983

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

The current year is focusing on loadings entering Red Hill Creek and Windermere Basin.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: West Central Region

DATE: August 2, 1983

PROJECT TITLE: Upper Ottawa St., Landfill Study, Hydrogeologic Component

KEY WORDS: Groundwater contamination, contaminants in fractured rock, landfill
leachate, leachate monitoring.

PRINCIPLE INVESTIGATOR

AND AFFILIATION University of Waterloo - Dr. John Cherry

LIAISON OFFICER

OR SUPERVISOR John Mayes

RESEARCH INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT X
CATEGORY: GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To develop and improve monitoring devices (such as multi-level piezo-
meters) and to investigate leachate detection and migration in limestone
bedrock Fracture Flow systems.

DESCRIPTION:

A two year project using a refining recently developed economic multi-
level piezometers.

Several installations (some inclined) surrounding Upper Ottawa St.
Landfill Site. Experts in Groundwater flow systems geochemistry and
particularly organic chemistry are investigating the site extracting
various physical and chemical data relating to the complex chemistry
and physics of leachate movement.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Summer, 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	250,000	125,000	3	1½	
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED <u>X</u> PROJECT	OTHER ———	

IS A REPORT ANTICIPATED?
Yes

PARTICIPATION BY OTHER MINISTRIES:

A joint study with the Ministry of Health investigating the health effects
of the Upper Ottawa St. Landfill Site. Primarily coordinated by a special

REMARKS: MOH committee headed by Ann Koven.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 22, 1983

PROJECT TITLE:

Assessment of Stormwater Detention Ponds.

KEY WORDS:

Stormwater, detention ponds.

PRINCIPLE INVESTIGATOR

AND AFFILIATION Mary Asselstine, York University

LIAISON OFFICER

OR SUPERVISOR S. Black, MOE

RESEARCH

INTERNAL X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —

CATEGORY:

GRANT

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the effectiveness of various stormwater detention facilities for removal of pollutants in runoff.

DESCRIPTION:

The quality and quantity of inflow and outflow will be monitored at four stormwater detention ponds. The ponds have been selected to reflect different land-use in the tributary catchments and different pond operating policies.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>March, 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	8.5K				
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY <u>X</u> FUNDING Experience '82	JOINTLY FUNDED — PROJECT	OTHER —	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Joint program, York University and MOE, Central Region.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 28, 1983

PROJECT TITLE:

Kennedy-Burnett Urban Stormwater Runoff Treatment Study.
(Part of the Rideau River Study).

KEY WORDS: Urban Drainage, Stormwater Runoff, Kennedy-Burnett Pond, Rideau River Study,
Flooding, Impoundment.

PRINCIPLE INVESTIGATOR

AND AFFILIATION Regional Municipality of Ottawa, Carleton.

LIAISON OFFICER

OR SUPERVISOR S. Black, MOE

RESEARCH INTERNAL ☐ UNSOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐
CATEGORY: GRANT ☐ SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the efficiency and effectiveness of short-term impoundment as a means of treatment for stormwater runoff from an urban catchment. To characterize runoff quantity and quality from the urban catchment in relation to precipitation, antecedent dry periods and changes in land use activities.

DESCRIPTION:

Data were collected over a three-year period to characterize the quantity and quality of runoff from the developing catchment and to evaluate the performance of the pond in that period.

Complementary laboratory and insitu studies were carried out to collect information about bacterial die-off rates and removal efficiencies for various pollutants in chemical assisted settling of runoff.

An attempt was made to utilize the data for predicting pollutant generation by the catchment and performance of the pond in the long-term by model simulation.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	<u>completed</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	380K	70K	None from MOE		
SOURCE OF FUNDS:	REGULAR WORK	SPECIAL MINISTRY	JOINTLY FUNDED	Provincial Lottery OTHER	
	PROGRAM	FUNDING	PROJECT	MOE contributed \$100K	

IS A REPORT ANTICIPATED?

Report "Urban Runoff Treatment In The Kennedy-Burnett Settling Pond", (March, 1983) published.

PARTICIPATION BY OTHER MINISTRIES:

No. Partners are Ottawa-Carleton, Environment Canada, etc.

REMARKS: Impoundment has been widely proposed as a method of stormwater treatment but reliable data relating to efficiency and effectiveness are scarce. Such data are required as input to the Rideau River Study and are desirable before the MOE advocates impoundment treatment for wide scale use.

Provincial Lottery Project 79-030-33 was the start of this investigation. See Page PL-7.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: December 28, 1983

PROJECT TITLE:

Nitrification/Denitrification As A Means of Reducing Power Requirements And Effluent Total Nitrogen In An Activated Sludge Treatment Plant

KEY WORDS:

Nitrification, Denitrification, Nitrates, Recycling, Mixing, Anoxic

PRINCIPLE INVESTIGATOR

AND AFFILIATION T. Brankovic

LIAISON OFFICER

OR SUPERVISOR R. K. Khettry

RESEARCH

INTERNAL X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —

CATEGORY:

GRANT —

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine operating procedures to maintain nitrification, i.e. SRT, aeration, detention time, etc.

To determine power savings under maximal operating conditions.

To establish (future) operating procedures for complete mix aeration tanks.

DESCRIPTION:

If nitrification can be maintained and aeration system approaches plug flow conditions, the nitrates in the return sludge can be utilized as oxygen donors at the influent end of the aeration tank. Mechanical mixers with much lower power consumption would replace part of the aeration equipment to assure complete mixing and maximum soluble BOD₅ reduction (carbon oxydation).

OPERATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	April, 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$5,000	\$3,500	60 man days	40 man days	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED	OTHER	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	No				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

PANCH: Laboratory Services And Applied Research Branch

DATE: December 28, 1983

PROJECT TITLE:

To Investigate The Costs And Maintenance Required To Operate A Full-Scale Chlorination/Dechlorination System.

KEY WORDS:

Chlorination, Wastewater, Treatment Plant, Dechlorination

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Tom Brankovic

LIAISON OFFICER

OR SUPERVISOR

R. K. Khettry

RESEARCH

CATEGORY:

INTERNAL ☒
 GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
 SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

to determine:

- The capital and operating costs of a full-scale chlorination/dechlorination system.
- The maintenance and reliability of the system.
- Feasibility to further optimize the operation of a chlorination/dechlorination system in order to reduce its overall costs.

DESCRIPTION:

Many WPCP's will be required to dechlorinate their final effluents before discharge, in order to continually protect public health and water quality concurrently. Hence, a thorough understanding of the costs and operating experience associated with a full-scale chlorination/dechlorination system is important to future installations. The study is being carried out in Milton WPCP which is presently the only WPCP which employs such a system in Ontario. The operator's experience, maintenance records, the capital and operating costs of this system will be analysed and reported.

Due to malfunction of the chlorination/dechlorination control system and the compound loop control, the project will be postponed until the spring of 1984.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	August, 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT \$7,500	CURRENT YEAR \$5,000	TOTAL PROJECT 60 man days	CURRENT YEAR 40 man days	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
IS A REPORT ANTICIPATED? Yes					
PARTICIPATION BY OTHER MINISTRIES: Participated by the Region of Halton.					
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 28, 1983

PROJECT TITLE:

Analysis And Control of Large Combined Sewer Systems

KEY WORDS:

Combined Sewer, Modelling, Pollution Control

PRINCIPLE INVESTIGATOR

AND AFFILIATION W. M. Wong, MOE

LIAISON OFFICER

R SUPERVISOR

RESEARCH	INTERNAL —	UNSOLICITED CONTRACT —	MULTI-YEAR PROJECT <u>X</u>
CATEGORY:	GRANT —	SOLICITED CONTRACT —	CONCURRENT PROJECT —

OBJECTIVE:

- To assess frequency, volume and pollutant loading from the Metro Toronto (Humber) combined sewer system under present and future land-use conditions.
- To assess the effectiveness of various strategies for the control of combined sewer overflow.

DESCRIPTION:

A component of the Toronto Area Watershed Management Study with the following activities with respect to the Humber Sewershed:

- Field measurements to determine frequency, quantity and quality of combined sewer overflows discharged to drainage basins of interest.
- Calibration and verification of SWMM model for simulation of combined sewer system behaviour under present and future land-use.
- Analysis of the effectiveness of various measures for overflow control.
- Development of an optimal strategy for the control of combined sewerage.

DURATION	3	PRESENT	1	REPORTING	March, 1985
OF PROJECT	YEARS	YEAR IS	YEAR	DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	200K	35K			
SOURCE OF	REGULAR	SPECIAL	JOINTLY	X	
FUNDING:	WORK —	MINISTRY —	FUNDED —	OTHER —	
	PROGRAM	FUNDING	PROJECT		

IS A REPORT ANTICIPATED?

Yes

ANTICIPATION BY OTHER MINISTRIES:

REMARKS:

Joint program with Metro Toronto, cities and boroughs and MOE, Central Region.

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 28, 1983

PROJECT TITLE:

Assessment and Modelling of I/I Flows In Stratford.

KEY WORDS:

Inflow/Infiltration, Simulation Modelling, Sanitary Sewerage.

PRINCIPLE INVESTIGATOR

AND AFFILIATION

W. M. Wong, MOE

LIAISON OFFICER

OR SUPERVISOR

RESEARCH	INTERNAL —	UNSOLICITED CONTRACT —	MULTI-YEAR PROJECT —	X
CATEGORY:	GRANT —	SOLICITED CONTRACT —	CONCURRENT PROJECT —	

OBJECTIVE:

To develop methodology for the assessment and prediction of wet weather flows in sanitary sewer systems.

DESCRIPTION:

Three phase study:

1. Field measurements and analysis to establish behaviour of dry and wet weather flows in Stratford sanitary sewerage including relationship of flow to population, water consumption and precipitation.
2. Development of simulation model to predict the behaviour of wet weather flows including
 - i) the quantities of sewage bypass and
 - ii) the projected effectiveness of corrective measures (storage and source control).
 - iii) verification of effectiveness of corrective measures through pilot sewer rehabilitation program supported by additional monitoring and simulation.

DURATION	PRESENT	REPORTING
OF PROJECT	YEAR IS	DATE
— 3 — YEARS	— 2 — YEAR	substantially complete

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	122K	57K		

SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
	—	—	X	—

IS A REPORT ANTICIPATED?
Draft report completed

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Program jointly sponsored by Stratford-Avon River Environmental Management Project and the City of Stratford.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 28, 1983

PROJECT TITLE:

To Determine The Average Unit Process Operating Costs In Several WPCP's.

KEY WORDS:

Operating costs, WPCP unit processes.

PRINCIPLE INVESTIGATOR

NAME AND AFFILIATION Tom Brankovic

LIAISON OFFICER

NAME AND SUPERVISOR R. K. Khetry

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT	—	MULTI-YEAR PROJECT	—
CATEGORY:	GRANT	SOLICITED CONTRACT	—	CONCURRENT PROJECT	—

OBJECTIVE:

To determine the operation and maintenance time and costs associated with individual unit processes in a typical WPCP.

DESCRIPTION:

The operator's time and maintenance costs required to run the individual treatment processes in a typical WPCP were obtained from twenty-five southern Ontario WPCP's.

This information will assist the consultant and municipal engineers to optimize future WPCP design and operation.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	March, 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$5,000	\$5,000	60 man days	60 man days	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED	OTHER	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Participated by the Regions of Halton, York and Durham.

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 22, 1983

PROJECT TITLE:

UV Disinfection of Secondary Effluent

KEY WORDS:

UV Disinfection, Secondary Effluent

PRINCIPLE INVESTIGATOR

AND AFFILIATION Peter Bohm, MOE

LIAISON OFFICER

OR SUPERVISOR K. W. A. Ho, MOE

RESEARCH	INTERNAL	—	UNSOLICITED CONTRACT	—	MULTI-YEAR PROJECT	—
CATEGORY:	GRANT	<input checked="" type="checkbox"/>	SOLICITED CONTRACT	—	CONCURRENT PROJECT	—

OBJECTIVE:

To investigate the effectiveness of UV Irradiation for the disinfection of a typical secondary effluent in an Ontario WPCP.

DESCRIPTION:

The study evaluated the performance of a pilot-scale, proprietary UV disinfection unit in a typical Southern Ontario WPCP (Richmond Hill). The relationship between UV intensity, exposure time, effluent physical/chemical quality and disinfection efficiency were investigated and reported.

DURATION OF PROJECT	<u>2.5</u> YEARS	PRESENT YEAR IS	<u>2.5</u> YEAR	REPORTING DATE	<u>March 31, 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$2K				
SOURCE OF FUNDS:	REGULAR WORK	SPECIAL MINISTRY	JOINTLY FUNDED	OTHER	
	PROGRAM	FUNDING	PROJECT		
IS A REPORT ANTICIPATED?	<u>Yes</u>				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

The study was reported and published in the Canadian Water Pollution Control Conference and Journal. A final draft report was prepared and is currently under review.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: Dec.22/83

PROJECT TITLE:

Hazardous Contaminants In Hamilton WPCP

KEY WORDS:

Hazardous Contaminants, Activated Sludge, Treatment

PRINCIPLE INVESTIGATOR

AND AFFILIATION Canviro Consultants Limited

LIAISON OFFICER

OR SUPERVISOR K. W. A. Ho

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT ☒

MULTI-YEAR PROJECT —

CATEGORY:

GRANT —

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

1. To estimate annual loadings of hazardous contaminants including metals, pesticides and selected trace organic contaminants discharged into the Hamilton Harbour.
2. To assess removal efficiency and operational factors affecting the removal of hazardous contaminants.

DESCRIPTION:

Raw sewage, final effluent and combined inplant wastes return will be sampled (24 hour composite) seven times per period for three periods (summer, winter and spring). Samples will be first separated into solids and liquid fractions. Each fraction will then be "quantitatively" analysed for hazardous contaminants.

The WPCP operating conditions will not be altered but closely monitored.

OPERATION OF PROJECT	1.5 YEARS	PRESENT YEAR IS	1 YEAR	REPORTING DATE	1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$60,000	\$45,000			
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED <input checked="" type="checkbox"/> PROJECT	OTHER —	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Environment Canada

REMARKS:

- This is one of a four parts study in the Hamilton WPCP. Studies to evaluate
- (1) Water quality in Hamilton Harbour (Water Resources Branch).
 - (2) Fate of hazardous contaminants during sludge incineration and
 - (3) effectiveness of three selected sludge treatment processes for the removal/fixation of hazardous contaminants (Environment Canada) are being
- MOE 1293 6/76 concurrently. Preliminary results were presented at the MOE, Technology Transfer Seminar.

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: December 22, 1983

PROJECT TITLE:

The Applicability of UV Disinfection Technology In Ontario Wastewater Treatment Plants.

KEY WORDS:

UV Disinfection, Municipal Wastewater, Treatment Plants.

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. L. W. MacPherson, Standard Biological Laboratories.

LIAISON OFFICER

OR SUPERVISOR K. W. A. Ho, MOE

RESEARCH	INTERNAL <input type="checkbox"/>	UNSOLICITED CONTRACT <input checked="" type="checkbox"/>	MULTI-YEAR PROJECT <input type="checkbox"/>
CATEGORY:	GRANT <input type="checkbox"/>	SOLICITED CONTRACT <input type="checkbox"/>	CONCURRENT PROJECT <input type="checkbox"/>

OBJECTIVE:

- To determine the applicability and design requirements for UV disinfection technology in Ontario, tertiary and secondary WPCP's;
- To investigate the significance of photo-reactivation of bacterial organisms in UV disinfected effluents.

DESCRIPTION:

- The study will be carried out in eight different tertiary and secondary municipal WPCP's. To assist design requirements for UV disinfection technology, UV dosages required to achieve target levels of coliform indicators and two selected pathogenic bacteria will be determined in relationship to effluent quality. The significance of photo-reactivation of coliforms indicators will be assessed against the photo-reactivation of pathogenic bacteria and disinfection condition provided initially.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>April 31, 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$40,750	\$17,800	None from MOE		
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input checked="" type="checkbox"/>	Provincial Lottery

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

Study results was reported in the MOE, Technology Transfer Seminar. A final report is being prepared for review.



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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services And Applied Research Branch

DATE: January 1, 1984

PROJECT TITLE:

Nitrification/Denitrification For the Control of Ammonia And Hydrogen Sulfide In
Lagoon Effluents.

KEY WORDS:

Extended aeration, sludge wasting, polishing pond, nitrification, denitrification, lagoons.

PRINCIPLE INVESTIGATOR

AND AFFILIATION W. Lewandowski

LIAISON OFFICER

OR SUPERVISOR R. K. Khettry

RESEARCH

INTERNAL ☒UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☐SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

- To establish design and operating criteria for a simplified nitrifying extended aeration system to be used as a pre-treatment unit ahead of lagoons during winter operation.
- To determine if the nitrate concentrations produced are adequate to prevent hydrogen sulfide accumulation in the lagoon contents.
- To determine if sludge wasting to the polishing pond has a detrimental effect on the final effluent quality.

DESCRIPTION:

An existing extended aeration activated sludge plant followed by a polishing lagoon will be operated in the mode mentioned above and monitored extensively until the fall of 1984.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	<u>Fall, 1984</u>
BUDGET:	TOTAL DOLLARS			MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
	\$4,000	\$3,000		0.3	0.1
SOURCE OF FUNDS:	REGULAR WORK <u>X</u>	SPECIAL MINISTRY <u> </u>		JOINTLY FUNDED <u> </u>	OTHER <u> </u>
	PROGRAM	FUNDING		PROJECT	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Southeastern Region

DATE: Jan. 5/84

PROJECT TITLE:

Enumeration of Aeromonas hydrophila in treated water.

KEY WORDS:

Enumeration, Aeromonas hydrophila, treated water.

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. Arthur Ley, Ministry of the Environment, Kingston

LIAISON OFFICER

SUPERVISOR Arthur Ley

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

Rapid isolation and enumeration of Aeromonas hydrophila in treated water by membrane filtration.

DESCRIPTION:

A major problem in developing a selective and differential medium for A. hydrophila is the biochemical similarities of this organism with many of the Enterobacteriaceae genera, including E. coli. The results of this study suggest that antibiotic inhibitors may be necessary to develop a medium for the routine analysis of this bacterium in treated waters by membrane filtration.

DURATION OF PROJECT	12 weeks	PRESENT YEAR IS	1983	REPORTING DATE	Nov. 1/83
BUDGET:	\$3306.00	TOTAL DOLLARS	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT
			\$3306.00	-	0.2
SOURCE OF FUNDS:	Experience' 83	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	No				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Utility Operations, Southeastern Region

DATE: Jan. 5/84

PROJECT TITLE:

Arsenic Sludge Dewatering & Disposal Study - -

KEY WORDS: Arsenic, Sludge Treatment, Sludge Disposal

PRINCIPAL INVESTIGATOR

AND AFFILIATION

IEC Beak Consultants Ltd. - Consultants

LIAISON OFFICER

OR SUPERVISOR

RESEARCH

INTERNAL - -

UNSOLICITED CONTRACT

☒

MULTI-YEAR PROJECT

—

CATEGORY:

GRANT —

SOLICITED CONTRACT

☒

CONCURRENT PROJECT

—

OBJECTIVE:

To study arsenic sludge dewatering processes and ultimate disposal of the sludge.

DESCRIPTION:

The study will comprise initial screening of sludge dewatering processes, including the potential of sludge fixation, with follow-up pilot scale work.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1983</u> YEAR	REPORTING DATE	<u>Dec. 31, 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	33,000		629 hours		
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED	OTHER	
	Utility Operations		PROJECT		
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	No				
REMARKS:					



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Environment
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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Intergovernmental Affairs and Strategic Projects

DATE:

PROJECT TITLE: Lake Sensitivity Mapping

KEY WORDS: lake alkalinity

PRINCIPLE INVESTIGATOR
AND AFFILIATION F. H. Schaedlich Consulting

LIAISON OFFICER
OR SUPERVISOR B. Neary

RESEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To produce maps outlining areas of Ontario containing lakes of similar alkalinity, and to provide summary statistics on water chemistry contained in a lake sensitivity data base.

DESCRIPTION:

DURATION OF PROJECT: 1 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE: March 31, 1984

BUDGET: TOTAL DOLLARS TOTAL PROJECT \$7,000 CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING ☒ APIOS JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

III. LIQUID & SOLID WASTE RESEARCH



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"FIELD MEASUREMENTS INFILTRATION THROUGH LANDFILL COVERS."

KEY WORDS: Infiltration into Landfills, Landfill Sites,
Lysimeters

PRINCIPLE INVESTIGATOR AND AFFILIATION P. K. Lee, Gartner Lee Associates, Buttonville Airport,
Markham, Ontario L3P 3J9

LIAISON OFFICER OR SUPERVISOR Dr. G. Hughes

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT X
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE:

To collect field measurements of the actual amount of water which infiltrates through various types of covers under various conditions at landfill sites. The data collected will be tested for reproducibility and compared to the results expected using the empirical calculations of infiltration.

DESCRIPTION:

Through a program of close liaison with the MOE and other regulatory and research bodies, 3 prototype lysimeter systems will be designed and constructed. These systems will be monitored for 12 months and the data analysed and checked for consistency. Additional lysimeter systems incorporating various cover materials and physical settings will then be constructed and monitored. A complete analysis and assessment of the results will be undertaken.

Upon completion of the study, we should know the effect of various types of cover materials, installed under various settings, on the volume of water which can reasonably be expected to infiltrate through the covers. The empirical values which are currently used in cover design can be checked against the field measurements and the equations modified accordingly.

DURATION OF PROJECT	PRESENT		REPORTING	
	YEAR IS	YEAR	DATE	
	<u>2</u> YEARS	<u>2nd</u> YEAR	<u>1984</u>	
BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$29,700	\$4,300	None	None
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK ——— PROGRAM	MINISTRY ——— FUNDING	FUNDED ——— PROJECT	OTHER ———

IS A REPORT ANTICIPATED? Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

No.

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"TORONTO JUNCTION TRIANGLE HEALTH STUDY."

KEY WORDS:

Epidemiological Studies, Environmental Health

PRINCIPLE INVESTIGATOR Dr. W. Spitzer
AND AFFILIATION McGill University

LIAISON OFFICER
OF SUPERVISOR G. Mierzynski

RESEARCH INTERNAL ☐ UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
CATEGORY: External GRANT ☒ SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

- To determine the adverse health effects of residents of the Junction Triangle area in Toronto due to industrial pollution and to compare the findings with those of residents of non-industrial areas of Toronto.
- To determine if the anomalies, stillbirth and death rates in the first year of life of Junction Triangle residents are higher than those in other areas of the City.

DESCRIPTION:

DURATION OF PROJECT	YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE
BUDGET:		TOTAL DOLLARS		MAN YEARS
		TOTAL PROJECT \$146,000	CURRENT YEAR \$25,000	TOTAL PROJECT CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING Provincial Lottery	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>
IS A REPORT ANTICIPATED?	Yes			

PARTICIPATION BY OTHER MINISTRIES: Ministries of Labour and Health, and City of Toronto.

REMARKS: \$75,000 - equally paid by MOE, MOL and MOH. Balance paid by City of Toronto.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"ASSESSING THE IMPACT OF HAZARDOUS LIQUIDS SPILLED ONTO SOIL."

KEY WORDS:

Environmental Impact, Hazardous Spills, Soil Contamination

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. G. Farquhar, Department of Civil Engineering
University of Waterloo

LIAISON OFFICER
OR SUPERVISOR

RESEARCH CATEGORY: External INTERNAL GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

- To develop methodology for predicting contaminant dispersal and attenuation arising from spills of hazardous liquids onto soil, and the environmental fate of these chemicals.
- Attention will centre on immiscible liquids including both sinkers and floaters.

DESCRIPTION:

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1986</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$141,800	\$25,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
		Provincial Lottery			
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"OTTAWA RIVER NUCLEAR SPILL CONTINGENCY MODEL DEVELOPMENT."

KEY WORDS:

Nuclear Spill, Spill contingency, Ottawa River.

PRINCIPLE INVESTIGATOR

Dr. M. Palmer

AND AFFILIATION

Gore & Storrie Ltd.

LIAISON OFFICER

OR SUPERVISOR

D. Draper

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT X

MULTI-YEAR PROJECT —

CATEGORY: External

GRANT —

SOLICITED CONTRACT —

CONCURRENT PROJECT —

OBJECTIVE:

- To develop a two-dimensional pollutant dispersion model for assessing the impact of accidental discharges of pollutants into water bodies.

DESCRIPTION:

The results will be used to predict the arrival time and concentration of spilled hazardous chemicals, and to define methods for linking both near and far-field spills as well as mixing and convective period zones.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE 1984

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$19,380

\$3,000

SOURCE OF
FUNDS:

REGULAR

SPECIAL

JOINTLY

WORK —

MINISTRY —

FUNDED —

OTHER —

PROGRAM

FUNDING

PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management

DATE: Aug. 31, 1983

PROJECT TITLE: Enhanced Sanitary Landfill Study

KEY WORDS: Landfill, methane gas, land use, anaerobic filter

PRINCIPLE INVESTIGATOR AND AFFILIATION: M. McKim, Ontario Research Foundation

LIAISON OFFICER OR SUPERVISOR: N. Ahlberg, Waste Management Branch

RESEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT ☒ SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

To investigate the engineering and economic aspects of a novel method of designing and operating a landfill to

- extend the life of landfills
- hasten land reclamation
- enhance methane yield and quality of landfill gas
- achieve a high degree of environmental control of landfills

DESCRIPTION:

The first phase of the study is a detailed assessment of the engineering and economic aspects of the proposed scheme to design a landfill in a generally conventional manner but to include a leachate collection and recycle piping system. Leachate collected would be treated in a separate anaerobic filter to improve the quality and yield of methane gas. Anaerobic filter discharge would be recycled to the landfill. Water would be added to the landfill to ensure saturation of the landfill material. Potential application to a new landfill, an existing landfill, and a closed landfill will be considered.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>December, 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	200,000	28,000	0.5	0.1	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	<input checked="" type="checkbox"/>	OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Energy

REMARKS:

Subsequent years' work dependent upon results obtained from first phase of study, no commitment made yet to proceed with originally proposed three phase study. Project funding 75% Ministry of Environment, 25% Ministry of Energy for first phase.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management

DATE: Aug. 26, 1983

PROJECT TITLE: Evaluation of the Use of RDF as a Fuel in Clay Brick Manufacture
Phase II - Plant trial

KEY WORDS: Refuse derived fuel, energy from waste, resource recovery

PRINCIPLE INVESTIGATOR
AND AFFILIATION Brampton Brick Limited, Brampton, Ontario

LIAISON OFFICER
OR SUPERVISOR N.R. Ahlberg, Waste Management Branch

RESEARCH	INTERNAL —	UNSOLICITED CONTRACT <u>X</u>	MULTI-YEAR PROJECT <u>X</u>
CATEGORY: -	GRANT —	SOLICITED CONTRACT —	CONCURRENT PROJECT —

OBJECTIVE:
To conduct laboratory research and a plant trial of the technical and economic evaluation of the use of refuse derived fuel as a burnout in clay brick manufacture.

DESCRIPTION:
The use of finely shredded refuse derived fuel as a burnout fuel in clay brick manufacture is being investigated through laboratory tests and a plant trial, incorporating finely shredded refuse derived fuel from the Experimental Plant for Resource Recovery. The physical and chemical characteristics of the resultant product and the potential for routine use will be assessed.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	<u>spring 1984</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$97,500	\$65,400	0.5	0.25
SOURCE OF FUNDS:	REGULAR WORK —	SPECIAL MINISTRY —	JOINTLY FUNDED <u>X</u>	OTHER —
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Energy

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management

DATE: Aug. 26, 1983

PROJECT TITLE:

Compost - An Evaluation of its Use in Container Growing and Field Production of Landscape Trees and Shrubs

KEY WORDS:

Compost, containers, landscaping trees, shrubs

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Associate Professor G.P. Lumis, Horticultural Science, University of Guelph in conjunction with Sheridan Nurseries and TCG Materials

LIAISON OFFICER
OR SUPERVISOR

P.J. Provias

RESEARCH CATEGORY: - INTERNAL GRANT X UNSOLICITED CONTRACT SOLICITED CONTRACT MULTI-YEAR PROJECT X CONCURRENT PROJECT

OBJECTIVE:

- To determine the suitability of the compost as an organic amendment for containers and field grown coniferous and deciduous species.
- To assess potential soluble salts and elemental toxicity and high pH problems in container mixer and field soils.

DESCRIPTION:

Sheridan Nurseries and TCG Materials are utilizing the ERRP compost in the trial application while the U of G monitors the experimental work and conducts the research. Sheridan supplied trees and shrubs for the work at their Georgetown farm where compost compared to manure will be incorporated in the soil at various rates. Observations and measurements will be made at TCG Materials gravel pit site (Aberfoyle) where the compost is being used as a mulch and soil additive.

- Initial bud break, shoot growth, leaf size, nutrients, root growth and winter survival will be studied.

DURATION OF PROJECT	PRESENT		REPORTING	
	YEAR IS	YEAR	DATE	
<u>2</u> YEARS	<u>2</u> YEAR		<u>Spring 1984</u>	
BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	27078	13410	1.0	0.50
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK <u>X</u>	MINISTRY <u> </u>	FUNDED <u> </u>	OTHER <u> </u>
	PROGRAM	FUNDING	PROJECT	
IS A REPORT ANTICIPATED? Yes				
PARTICIPATION BY OTHER MINISTRIES:				

REMARKS:



Ontario

Ministry
of the
Environment

- 129 -

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management

DATE: Aug. 26, 1983

PROJECT TITLE: Experimental Plant for Resource Recovery

KEY WORDS: Resource Recovery, Waste Management, shredding, refuse derived fuel, ferrous research

PRINCIPLE INVESTIGATOR

AND AFFILIATION N.R. Ahlberg, Waste Management Branch, Ministry of the Environment

LIAISON OFFICER
OR SUPERVISOR N.R. Ahlberg

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT	MULTI-YEAR PROJECT
CATEGORY: -	GRANT	SOLICITED CONTRACT	CONCURRENT PROJECT

OBJECTIVE:

1. To develop and evaluate processes and equipment for resource recovery
2. To develop criteria for design and for estimating capital and operating costs
3. To provide a regular supply of recovered materials for product utilization and market development.

DESCRIPTION:

The Experimental Plant for Resource Recovery processes 200 tonnes per day of solid waste through processes including shredding, air classification, screening, incineration and composting to recover materials for utilization within existing industry. Plant products include corrugated cardboard, refuse derived fuel, ferrous metal and compost. Products are either sold in industry or provided for market development projects.

DURATION OF PROJECT	YEARS	PRESENT YEAR IS	7th YEAR	REPORTING DATE
BUDGET:	TOTAL DOLLARS		MAN YEARS	
15,000,000	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
Capital Cost		2,000,000	Est. 60	4
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED	OTHER
IS A REPORT ANTICIPATED?				
Yes				
PARTICIPATION BY OTHER MINISTRIES:				

REMARKS:

Reports on specific plant processes issued on an intermittent basis.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management

DATE: Aug. 26, 1983

PROJECT TITLE:

Foliar and Soil Analysis - Potting Soils
U of Guelph - Compost Utilization

KEY WORDS:

Compost, soils and foliar

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. G. Lumis, University of Guelph

LIAISON OFFICER

OR SUPERVISOR P.J. Provias

RESEARCH

CATEGORY: -

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

To determine optimum potting soils using ERRP compost and greenhouse growing in containers. Special attention to pH, salts and other potential growing deterrents.

DESCRIPTION:

Greenhouse trial growing Forsythia Intermedia in 15 cm pots. Initial tests were to be done on pH, metal salts, nutrient values, and then subsequently the heavy metal take-up in the folio.

Mixtures of compost/sand/peat moss would be used against standard container mixtures. Original work indicated boron toxicity with the boron coming from the ERRP compost. Further testing is to trace the boron and also other contaminants if present.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

1983 YEAR

REPORTING
DATE Fall/83

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR
800

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK X
PROGRAM

SPECIAL
MINISTRY
FUNDING

JOINTLY
FUNDED
PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes, one report issued Sept./82.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Payment by the MOE for analysis only, done by the U of Guelph.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: West Central Region

DATE: August 2, 1983

PROJECT TITLE: Feasibility of Solidification of Windermere Basin Sediments

KEY WORDS: Sediments, Solidification

PRINCIPLE INVESTIGATOR
AND AFFILIATION Wm. Trow & Assoc.

LIAISON OFFICER
OR SUPERVISOR R. Stewart (S. Irwin)

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT —X— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To solidify Windermere Basin Sediments with waste cement kiln dust to "fix" contaminants and to produce a material acceptable for industrial landfill.

DESCRIPTION: The consultant, Trow & Assoc. were to test the feasibility on a pilot scale project to determine the success in solidifying contaminated sediments in Hamilton Harbour (Windermere Basin) with a waste material cement kiln dust, and end up with environmentally acceptable and structurally sound material for construction fill.

DURATION OF PROJECT —1— YEARS PRESENT YEAR IS ——— YEAR REPORTING DATE March 19, 1983

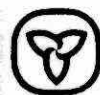
BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	10,000		1/3	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
	Hamilton Harbour Budget	—X—	—	—

IS A REPORT ANTICIPATED? Yes - Received

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

IV. ANALYTICAL METHOD DEVELOPMENT



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"CHEMICAL IDENTIFICATION AND BIOLOGICAL ASSAY STUDIES OF ENVIRONMENTAL MUTAGENS, PROMOTERS AND INHIBITORS."

KEY WORDS: Mutagens, Promoters, Hazardous Contaminants, Carcinogens, Airborne Mutagens, Waterborne Mutagens

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. M. Katz, York University
4700 Keele Street, Downsview, Ontario M3J 1P3

LIAISON OFFICER OR SUPERVISOR Dr. D. Rokosh

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

- to utilize newly developed bio-assay systems to determine mutagenic and carcinogenic potential of toxic pollutants.
- to separate and identify quantitatively PAH and other potentially mutagenic and carcinogenic organic compounds from polluted water.
- to identify individual or combinations of chemicals with mutagenic activity.
- to determine promoters and inhibitors of mutagenicity or carcinogenicity.
- to investigate the effect of mutagenic chemicals on Laboratory plants and fish.

DESCRIPTION:

It is planned to utilize newly developed in vivo bio-assay systems to determine the mutagenic and carcinogenic potential of various combinations of chemicals found in air and water. It is also planned to investigate promoters and inhibitors of mutagenic potency using mice and fish as test animals. The tier testing will include a spectrum of genetic toxicity tests such as bacterial mutagenicity, in vivo and/or in vitro sister chromatid exchange, in vivo chromosomal aberrations (micronuclei) and in vivo sperm head abnormalities.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$452,844	\$80,500	None	None	
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY		
	WORK	MINISTRY	FUNDED	OTHER	
	PROGRAM	FUNDING	PROJECT		
	Provincial Lottery Trust Funds				

IS A REPORT ANTICIPATED? Yes. Progress reports provided to end of 2nd year.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Provincial Lottery contribution - \$392,800



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "THE DEVELOPMENT OF A FRESHWATER FISH TEST TO IDENTIFY
AQUATIC TOXIC CONTAMINANTS."

KEY WORDS: Aquatic Toxicity, Fish Toxicity Test, Hazardous Contaminants

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. Valli and I. Smith, Department of Biology
University of Guelph, Guelph, Ontario

LIAISON OFFICER OR SUPERVISOR G. Craig, D. Rokosh

RESEARCH CATEGORY: External INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To assess the use of fish embryos in detecting mutagenic chemicals by examining:
- micronucleus and cellular tyknosis;
- longer exposure time effect on sensitivity;
- use of non-mutagens to check for false positive;
- some long-term health effects of induced mutation.

DESCRIPTION:

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$37,500	\$19,300			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes. M.Sc. thesis and paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "REVISED MONITORING SCHEME FOR PERSISTENT AND TOXIC ORGANICS IN GREAT LAKES SPORTS FISH."

KEY WORDS: Toxic Organics, Fish Analysis, Great Lakes Fish, Analytical Methods.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. A. Benedek
Zenon Environmental Enterprises Ltd.

LIAISON OFFICER OR SUPERVISOR G. A. V. Rees

RESEARCH CATEGORY: External INTERNAL — GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:
To develop and implement new monitoring methods for the characterization of persistent chemicals in Great Lakes fish.

DESCRIPTION:

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	1st YEAR	REPORTING DATE	1985
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR			
	\$130,000	\$80,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	Regular Research	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes. Paper presented at Technology Transfer Conference No. 4.				
PARTICIPATION BY OTHER MINISTRIES:	None				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"COLLABORATIVE STUDY ON SHORT-TERM TESTS FOR GENOTOXICITY AND
CARCINOGENICITY."

KEY WORDS: Ames test, Genotoxicity of Organics, Hazardous Contaminants,
Analytical methods.

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. D. Logan, Department of Biology
York University

LIAISON OFFICER
OR SUPERVISOR

Dr. D. Rokosh

RESEARCH

CATEGORY: External

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

- To participate in a United Nations international study on genotoxicity and carcinogenicity of a predetermined group of hazardous chemicals.
- To apply above techniques to 6 additional chemical compounds selected from MOE list of priority chemicals.

DESCRIPTION:

DURATION
OF PROJECT

1

YEARS

PRESENT
YEAR IS

1st

YEAR

REPORTING
DATE

1984

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$60,000

-

SOURCE OF
FUNDS:

REGULAR
WORK
PROGRAM

SPECIAL
MINISTRY
FUNDING

Regular
Research

JOINTLY
FUNDED
PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

MOE only

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "EVALUATION AND APPLICATION OF PULSED NUCLEAR MAGNETIC RESONANCE IN THE ANALYSIS OF ENVIRONMENTAL SAMPLES."

KEY WORDS: P-NMR, Environmental Analysis, Organic Analysis

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J. Easton, Department of Chemistry
Ryerson Polytechnical Institute

LIAISON OFFICER OR SUPERVISOR Dr. O. Meresz

RESEARCH CATEGORY: External INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:
- A new Pulsed Nuclear Magnetic Resonance instrument will be used to develop methods for the characterization of organic compounds in environmental and waste samples.
- The evaluated procedure and equipment will be transferred for use in MOE Laboratories.

DESCRIPTION:

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>May 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$49,000	-			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
		Regular Research			

IS A REPORT ANTICIPATED?

Yes. Paper presented at Technology Transfer Conference No. 4.

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "DEVELOPMENT OF NON-GC/MS ORIENTED PROTOCOL FOR ROUTINE ANALYSIS OF TRACE ORGANIC CONTAMINANTS IN RAW SEWAGES AND FINAL EFFLUENTS."

KEY WORDS: Sewage analysis, Analytical Method development, Hazardous Contaminants

PRINCIPLE INVESTIGATOR
AND AFFILIATION Contractor to be selected.

LIAISON OFFICER
OR SUPERVISOR A. Ho

RESEARCH CATEGORY: External INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ☒ CONCURRENT PROJECT ———

OBJECTIVE:

- To develop a protocol for the characterization of organic contaminants in sewage and final effluents.
- To validate the developed methodology and document it for transfer and use by MOE Laboratory.

DESCRIPTION:

DURATION OF PROJECT	2 YEARS	PRESENT		1st YEAR	REPORTING DATE	1985
		YEAR IS	YEAR			
BUDGET:		TOTAL DOLLARS			MAN YEARS	
		TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	PROVINCIAL Lottery	JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"DEVELOPMENT OF A COMPUTER PROGRAM FOR MASS SPECTROMETRY
DATA INTERPRETATION."

KEY WORDS:

MS Computer Program, Mass Spectrometry Interpretation

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Contract

LIAISON OFFICER

OR SUPERVISOR

Ms G. Foster

RESEARCH

CATEGORY: External

INTERNAL —

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT X

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To review and develop computer techniques-programs for the identification,
quantitation, and quality control of Mass Spectrometry analytical data.

DESCRIPTION:

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1986</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
		Regular Research			
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "STUDIES OF METHODOLOGY AND INSTRUMENTAL CAPABILITIES FOR OPTIMUM AND RAPID ANALYSIS OF PCDD AND PCDF COMPOUNDS IN WATER AND RELATED ENVIRONMENTAL SAMPLES."

KEY WORDS: Dioxins and Furans, Water Analysis, Instrumental Methods of Analysis, Analytical Method Development

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. F. W. Karasek, Department of Chemistry
University of Waterloo

LIAISON OFFICER OR SUPERVISOR H. Tosine

RESEARCH CATEGORY: External INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

- To develop sensitive analytical methods for the determination of ultra traces of dioxins and furans in drinking and surface waters and incinerator fly-ash.
- To verify the credibility of the new method.

DESCRIPTION:

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1985</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$42,800	\$25,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	PROVINCIAL Lottery	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE: "AN EXTRACTION AND CONCENTRATION METHOD FOR THE TESTING OF LANDFILL LEACHATES, SOIL FRACTIONS, AND LIQUID INDUSTRIAL WASTES FOR GENOTOXIC ORGANIC COMPOUNDS."

KEY WORDS: Leachate, Concentration of Organic Compounds, Hazardous Contaminants, Liquid Industrial Wastes

PRINCIPLE INVESTIGATOR
AND AFFILIATION Ontario Research Foundation

LIAISON OFFICER
OR SUPERVISOR Dr. D. Rokosh

RESEARCH CATEGORY: External INTERNAL ——— UNSOLICITED CONTRACT X MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE:

- To develop and validate methods for mutagenicity testing of leachates and groundwater at waste disposal sites. Validate the methods and apply to water and soil.

DESCRIPTION:

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>1986</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT \$300,000	CURRENT YEAR \$25,000	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ———	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	None				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Policy and Planning Branch, Research Coordination Office DATE: December 1983

PROJECT TITLE:

"COMPARISON OF THE AMES TEST AND THE REPLICATIVE KILLING ASSAY AS
DETECTORS OF MUTAGENICITY IN CHEMICAL COMPOUNDS AND ENVIRONMENTAL SAMPLES."

KEY WORDS:

Mutagenicity Testing, Replicative Killing Assay, Ames Test

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. D. Logan, Department of Biology
York University

LIAISON OFFICER
OR SUPERVISOR

Dr. D. Rokosh

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE:

- To evaluate the Replicative Killing Assay as an adjunct to the Ames test for mutagenic activity.
- To compare the specificities and sensitivities of both assays on mutagenic standard compounds and concentrated water samples.

DESCRIPTION:

Preliminary tests in the Ministry have shown a potential use of this test to detect mutagenic activities. Fifteen model compounds will be evaluated parallel to Ames testing, and the sensitivity will be established.

The results will be transferred for use at the MOE Laboratory.

DURATION
OF PROJECT

1 YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

1984

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT
\$13,000

CURRENT YEAR
\$13,000

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF
FUNDS:

REGULAR
WORK —
PROGRAM

SPECIAL
MINISTRY Regular
FUNDING Research

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LAB SERVICES & APPLIED RESEARCH BRANCH

DATE: December 19/83

PROJECT TITLE: Characterization of Phenols in Waters

KEY WORDS: Speciation, phenols, water, analysis, cap G.C.

PRINCIPLE INVESTIGATOR AND AFFILIATION Y. Jones, Pesticides Section

LIAISON OFFICER OR SUPERVISOR G.A.V. Rees, Pesticides Section

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a capillary G.C. method to speciate individual phenols in water samples which have been found to contain phenols, using general analytical procedures.

DESCRIPTION:

When water samples have been found to contain phenols, it is proposed to speciate the phenols present by using capillary gas chromatography. It is proposed that an analytical procedure will be developed to perform this speciation, involving purchase of analytical standards and carrying out of recovery studies.

Also, cap G.C. conditions will be optimized for efficient separation of the compounds involved.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS 1983 YEAR		REPORTING DATE	unknown
		TOTAL PROJECT	CURRENT YEAR		
BUDGET:		10,000	5,000	0.50	0.25
SOURCE OF FUNDS:		REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED?

yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LAB. SERVICES & APPLIED RESEARCH

DATE: December 19/83

PROJECT TITLE:

Analysis of Fatty and Resin Acids in Waters and Sediments

KEY WORDS:

analysis, resin acids, fatty acids, aromatics cap. G.C.

PRINCIPLE INVESTIGATOR

AND AFFILIATION Y. Jones, (Pesticides Section)

LIAISON OFFICER

OR SUPERVISOR G.A.V. Rees, Pesticides Section

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To produce a method for the analysis of fatty, resin and aromatic acids in waters and sediments, using a capillary gas chromatography

DESCRIPTION:

Appropriate standards will be obtained, after which the G.C. conditions will be optimized for analysis of these compounds. Recovery studies will be performed on the matrices to be analyzed to ensure analytical efficiency and reproducibility of results.

When the above stages have been completed, the analytical procedure will be implemented

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1983</u> YEAR	REPORTING DATE	<u>unknown</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	10,000	5,000	0.5	0.2
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK <input checked="" type="checkbox"/>	MINISTRY <input type="checkbox"/>	FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED?

yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LAB SERVICES & APPLIED RESEARCH PESTICIDES SECTION

DATE: December 1983

PROJECT TITLE:

PAH Analysis in Ambient Air

KEY WORDS:

PAH, analysis, air

PRINCIPLE INVESTIGATOR

AND AFFILIATION

J. Osborne, Pesticides Section

LIAISON OFFICER

OR SUPERVISOR

G.A.V. Rees, Pesticides Section

RESEARCH

CATEGORY:

INTERNAL ~~—X—~~

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT ~~—X—~~

CONCURRENT PROJECT —

OBJECTIVE:

To develop an improved procedure for the analysis of PAH's in ambient air

DESCRIPTION:

A new procedure will be developed for PAH's in ambient air using capillary gas chromatography.

A cold on-column injector will be tested for use in this analysis

Recovery studies will be conducted to determine the analytical efficiency of the procedure prior to its implementation.

DURATION
OF PROJECT

2 YEARS

PRESENT

YEAR IS

1st YEAR

REPORTING
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$10,000

\$5,000

0.25

0.10

SOURCE OF

REGULAR

SPECIAL

JOINTLY

FUNDS:

WORK X

MINISTRY —

FUNDED —

OTHER —

PROGRAM

FUNDING

PROJECT

IS A REPORT ANTICIPATED?

No. Procedure will be published in MOE methods manual

PARTICIPATION BY OTHER MINISTRIES:

no

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Lab. Services & Applied Research Branch

DATE: December 1983

PROJECT TITLE: Investigation of the storage stability of various multi-component cartridges used in the analysis of ambient air for trace organic contaminants

KEY WORDS: trace organics, ambient air, analysis, stability, adsorption cartridges

PRINCIPLE INVESTIGATOR
AND AFFILIATION

J. Osborne, Pesticides Section

LIAISON OFFICER
OR SUPERVISOR

G.A.V. Rees, Pesticides Section

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☒
CONCURRENT PROJECT ☐

OBJECTIVE: To compare the stability of trace organic residues adsorbed onto multi-component cartridges from ambient air

DESCRIPTION:

Two multi-component adsorption cartridges used for sampling ambient air will be tested to determine the stability of a wide range of trace organic contaminants upon storage. The organics will be eluted off the cartridges and analyzed by capillary gas chromatography

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>-</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$15,000	\$5,000	\$1.0	0.3	
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input checked="" type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	ARB/LSARB

IS A REPORT ANTICIPATED?

no

PARTICIPATION BY OTHER MINISTRIES:

no

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

RANCH: LABORATORY SERVICES & APPLIED RESEARCH DATE: December 1983

PROJECT TITLE: ESTABLISHMENT OF THE TOTAL ORGANIC HALOGEN (TOX) METHOD FOR
SCREENING LANDFILL SITE SAMPLES

KEY WORDS: TOX, totalhalogen, halogenated organic solvents, PCBs, microcoulometry, water samples

PRINCIPLE INVESTIGATOR

ID AFFILIATION

DR. G.S. HENDRY Pesticides Section

PRINCIPAL OFFICER

SUPERVISOR

DR. E.G. ADAMEK Pesticides Section

SEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☒

OBJECTIVE:

To establish and test the analytical method for the determination of TOX in the screening of landfill samples by using the Dohrmann DX-20 Total Organic Halogen Analyzer.

DESCRIPTION:

The Dohrmann Adsorption Unit and other functional components of the Dohrmann DX-20 Analyzer System for the analysis of TOX will be tested for compliance with the manufacturer's specifications. Subsequently, development work will be aimed at gathering information on the following topics: 1) Charcoal Performance Characteristics, 2) Accuracy, 3) Reproducibility, 4) Interferences (by inorganic halides, etc., 5) Minimum Detection Level, 6) Linearity of Detector Response, 7) Recoveries of Halides from Organic Standards, 8) Comparison with Other Analytical Methods (using organic halogen standards and actual landfill samples).

PROJECT	YEARS	PRESENT YEAR IS	1st YEAR	REPORTING DATE	June 1984
BUDGET:	\$28,000	TOTAL PROJECT \$28,000	CURRENT YEAR \$28,000	TOTAL PROJECT 0.50	CURRENT YEAR 0.50
PERCENTAGE OF FUNDING:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	

REPORT ANTICIPATED?

yes

PARTICIPATION BY OTHER MINISTRIES:

no

WORKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: December 198

PROJECT TITLE: Establishment of the Total Purgeable Organic Halogen (POX) Method for Screening Landfill Site Samples

KEY WORDS:

POX, purgeables, organic halogen, haloforms, volatile organohalides

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. G.S. Hendry Pesticides Section

LIAISON OFFICER
OR SUPERVISOR

Dr. E.G. Adamek Pesticides Section

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To establish and test the analytical method for the determination of POX in the screening of aqueous landfill samples, by using the Dohrmann DX-20 Total Organic Halogen Analyzer

DESCRIPTION:

After setting up the new model of the Dohrmann DX-20 Analyzer System, the instrument will be tested for compliance with the manufacturer's qualifications. Subsequently, development work will be aimed at gathering information on the following topics: 1) Accuracy, 2) Reproducibility, 3) Interferences (by halides, etc), 4) Minimum Detection Level, 5) Linearity of Detector Response, 6) Recoveries of Halides from Organic Standards, 7) Comparison with Other Methods (using organic halogen standards and actual landfill samples).

DURATION
OF PROJECT

$\frac{1}{2}$ YEARS

PRESENT
YEAR IS

1st YEAR

REPORTING
DATE

February 198

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT
28,000

CURRENT YEAR
28,000

TOTAL PROJECT
0.5

CURRENT YEAR
0.5

SOURCE OF
FUNDS:

MOE

REGULAR
WORK ☒
PROGRAM

SPECIAL
MINISTRY ☐
FUNDING

JOINTLY
FUNDED ☐
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

yes

PARTICIPATION BY OTHER MINISTRIES:

no

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: December 1983

PROJECT TITLE:

A New Landfill Site Monitoring Scheme

KEY WORDS: Sanitary Landfill, Co-Disposal Leachates, EP-Test, Toxicity, Environmental-impact, Monitoring, Tiered-testing, Data-base, Groundwater

PRINCIPLE INVESTIGATOR AND AFFILIATION G. S. Hendry Pesticides Section

LIAISON OFFICER OR SUPERVISOR (J. E. Pagel) E.G. Adamek

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To review all aspects of landfill site operations with the objective of establishing a new landfill site monitoring scheme.

DESCRIPTION:

1. To carry out an in-depth literature search which will assist in the design of a more systematic laboratory approach to landfill monitoring.
2. To devise a tiered system of testing, which will promote the economical use of simple, rapid, low cost tests first, followed by complex, expensive tests later, and only when necessary.
3. To aid in the evaluation of limitations to the present monitoring scheme, by establishing liaison with other MOE groups dealing with landfill waste disposal.
4. To set up a separate data base of landfill site data and background information, utilising the laboratory information system (LIS) as a source of data.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	<u>Oct. 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT \$20,000	CURRENT YEAR \$10,000	TOTAL PROJECT 2.0	CURRENT YEAR 1.0	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS: The project objectives as shown under "Description" have been completed for items 1 to 3. Regarding item 4, the setting up of a computerized landfill site data base was postponed pending availability of suitable software and means for data entry.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LABORATORY SERVICES, PESTICIDES SECTION

DATE: December 1983

PROJECT TITLE: Development of analytical methodology for analysis of chlorodibenzofurans and dioxins in environmental samples

KEY WORDS: Analysis, dioxin, GC/MS, water, fish, sediment, air, capillary, GC/MS

PRINCIPAL INVESTIGATOR AND AFFILIATION H. Tosine, Pesticides Section

LIAISON OFFICER OR SUPERVISOR G.A.V. Rees Pesticides Section

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

To devise, test and utilize isolation, cleanup and detection of chlorodibenzofurans and dioxins in air, water, fish, sediment and chemical landfill sites.

DESCRIPTION:

The analysis of complex environmental samples for furans and dioxins is complicated by interfering hydrocarbons and other chlorinated congeners. A method will be developed which will quickly and efficiently clean up and separate the chlorinated furans and dioxins from interferences. The chromatographic clean up will be complemented by capillary GC/MS, providing a refined separation of the isomers of the furans and dioxins for quantitation by computer.

PERIOD OF PROJECT	2 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	July 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$24,000	\$8,000	1	1/3	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED?

ANTICIPATION BY OTHER MINISTRIES:

no

REMARKS:

On-going: Due to other high priority Ministry programmes, notably, the survey of raw and treated drinking waters and the analysis of incineration emissions, extra resources for method development of soil, sediment and ambient air analysis have not been available.

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LABORATORY SERVICES BRANCH - PESTICIDES SECTION

DATE: December 1983

PROJECT TITLE:

Occurrence of PCDDs/PCDFs in incineration source samples

KEY WORDS:

PCDD, PCDF, stack samples, incineration samples

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Helle Tosine, Pesticides Section

LIAISON OFFICER
OR SUPERVISOR

G.A.V. Rees Pesticides Section

RESEARCH
CATEGORY:

INTERNAL ☒ GRANT ☐

UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop a methodology for efficient extraction and clean-up of incineration samples for ppt levels of PCDDs/PCDFs; To develop automated software for the GC/MS analysis, quantitation and confirmation of PCDDs/PCDFs in these samples; To analyse all parts of incineration source samples from 3 Ontario sites for PCDDs/PCDFs.

DESCRIPTION:

As part of a joint MOE (LSB AND ARB) and Ministry of Energy project, three incineration sources will be tested for chlorinated organics: PCDDs, PCDFs, chlorophenols, chlorinated aromatics and PCBS. This project involves extensive method development for the efficient clean-up and fractionation of these samples for the range of chlorinated organics listed. Also, extensive software must be written to provide automated confirmation and quantitation by GC/MS for the entire range of PCDDs & PCDFs.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	Oct. 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$24,000	\$12,000	1	4	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

yes

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Energy

REMARKS:

Analysis of incinerator samples is complete and report writing is in progress
Data obtained require interpretation



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LABORATORY SERVICES, PESTICIDES SECTION

DATE: December 1983

PROJECT TITLE: Extension of HCl digestion/extraction of fish tissues
for the analysis of organic pollutants

KEY WORDS: Acid (HCL) digestion, herbicides, organic pollutants

PRINCIPLE INVESTIGATOR AND AFFILIATION: George Crawford, Pesticides Section

LIAISON OFFICER OR SUPERVISOR: G.A.V. Rees Pesticides Section

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To extend the use of an acid extraction/digestion procedure to the analysis of fish and biota for herbicide residues and organic pollutants.

DESCRIPTION: This acid digestion has proven effective for PCB/OC analysis in fish. The intention is to expand its use to analysis of other pesticides such as chlorophenoxy acids and triazines as well as to chlorophenols and chlorinated aromatics.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$12,000	\$6,000	<u>1</u>	<u>1</u>	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?					
PARTICIPATION BY OTHER MINISTRIES:					
no					
REMARKS:					
In <u>abeyance</u> due to other priorities					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LABORATORY SERVICES BRANCH, PESTICIDES SECTION DATE: December 1983

PROJECT TITLE: Evaluation of capillary GC for routine fish contamination monitoring

KEY WORDS: Capillary columns, electron capture, fish analysis

PRINCIPLE INVESTIGATOR AND AFFILIATION J. Osborne, and G. Crawford, Pesticides Section

LIAISON OFFICER OR SUPERVISOR G.A.V. Rees Pesticides Section

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To investigate the feasibility of using capillary columns for the routine analysis of pesticides, herbicides and other halogenated organics in fish

DESCRIPTION: Due to the low resolving capability of packed GC columns, interfering materials may not be fully separated from the compounds of interest. Accordingly, the results reported may not be the true value due to presence of these interferences. By use of the capillary columns it may be possible to fully resolve these interferences and provide a more accurate result.

A comparison will be made of the results obtained from fish extracts analysed on both packed and capillary columns for PCB's and other halogenated environmental contaminants.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$12,000	\$4,000	4	1/6	
SOURCE OF FUNDS:	REGULAR <u>x</u>	SPECIAL	JOINTLY		
	WORK	MINISTRY	FUNDED	OTHER	
	PROGRAM	FUNDING	PROJECT		

IS A REPORT ANTICIPATED? Procedure will be included in MOE methods manual.

PARTICIPATION BY OTHER MINISTRIES: no

REMARKS: Mostly complete. Simultaneous dual capillary gas chromatography will be assessed for PCB analysis



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LAB SERVICES AND APPLIED RESEARCH

DATE: Jan. 10, 1984

PROJECT TITLE:

DETERMINATION OF POLYCHLORINATED DIBENZO-p-DIOXINS AND DIBENZOFURANS IN FISH

KEY WORDS:

Polychlorinated dibenzo-p-dioxins, Polychlorinated dibenzofurans, GC-MS, HPLC, trace analysis

PRINCIPLE INVESTIGATOR

AND AFFILIATION R.E. Clement MOE LS & ARB - Drinking Water Organics Section

LIAISON OFFICER

H.M. Tosine

OR SUPERVISOR

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐
CONCURRENT PROJECT ☐

OBJECTIVE:

To expand the current MOE method for 2,3,7,8-tetrachlorodibenzo-p-dioxin in fish to include all dibenzo-p-dioxin and dibenzofuran chlorinated congeners

DESCRIPTION:

The method will include HPLC fractionation, column chromatography cleanup and GC-MS analysis. One HPLC fraction contains the 2,3,7,8-TCDD isomer and the other contains other TCDD compounds as well as the remaining dioxin and furan chlorinated congeners. Quality control is provided by spiking with labelled chlorinated dioxins

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>N.A.</u>					
BUDGET:	TOTAL DOLLARS		MAN YEARS							
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR						
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>						
IS A REPORT ANTICIPATED?	yes									
PARTICIPATION BY OTHER MINISTRIES:										
REMARKS:										

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services

DATE: December 1983

PROJECT TITLE: Multi-component cartridges for sampling and analysis of trace organics in air.

KEY WORDS: analysis-air-organic contaminants

PRINCIPLE INVESTIGATOR
 AND AFFILIATION J. Osborne, Pesticides Section

LIAISON OFFICER
 AND SUPERVISOR G.A.V. Rees Pesticides Section

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To evaluate a multi-component cartridge for sampling and analysis of air for various classes of organic trace contaminants

DESCRIPTION: A combined Carbosieve and Florisil cartridge has been designed. Preliminary tests will determine the efficiency of a thermal cleaning procedure for the cartridge packing. If this proves satisfactory, a recovery study will be conducted by spiking cartridges, pumping air through and eluting with solvent to recover OC's, PCB's and chlorinated aromatics. This methodology will then be extended to other classes of pesticides and organic trace contaminants.

PERIOD OF PROJECT	2 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE
BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT \$16,000	CURRENT YEAR \$8,000	TOTAL PROJECT 2/3	CURRENT YEAR 1/3
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
Joint ARB/LSB			<u>X</u> ARB LSARB	
IS A REPORT ANTICIPATED?	no			
PARTICIPATION BY OTHER MINISTRIES:	no			

REMARKS: project completed



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LABORATORY SERVICES BRANCH, PESTICIDES SECTION DATE: December 1983

PROJECT TITLE: Development of high resolution capillary G.C. methodology for the analysis of chlorinated industrial organics

KEY WORDS: Chlorinated industrial organics - high resolution capillary GC

PRINCIPLE INVESTIGATOR
AND AFFILIATION J. Osborne, Pesticides Section

LIAISON OFFICER
OR SUPERVISOR G.A.V. Rees Pesticides Section

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To investigate the use of high resolution capillary columns for the analysis of complex industrial organic waste samples. If proven feasible, the capillary columns will be incorporated into the automatic gas chromatographic instruments for routine analysis.

DESCRIPTION: The regular packed gas chromatographic columns do not have the required resolving capabilities for the analysis of complex industrial waste samples. It is proposed to evaluate specific capillary columns of various lengths for:

- (a) analysis of complex halogenated organic wastes in environmental samples
- (b) suitability for automated analysis

DURATION OF PROJECT	3 YEARS	PRESENT YEAR IS	3rd YEAR	REPORTING DATE	BUDGET:	
					TOTAL PROJECT	CURRENT YEAR
					\$48,000	\$8,000
					2	1/3
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/>	SPECIAL MINISTRY <input type="checkbox"/>	JOINTLY FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>		
	PROGRAM	FUNDING	PROJECT			

IS A REPORT ANTICIPATED? Procedure will be included in MOE methods manual.

PARTICIPATION BY OTHER MINISTRIES:

no

REMARKS: Project complete



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services and Applied Research

DATE: Aug. 1983

PROJECT TITLE:

Identification of Fecal coliforms and Fecal streptococci and verification of newer tests ability to differentiate between human and non-human fecal pollution.

KEY WORDS: E. coli, Enterococci, Pollution Source, Bacterial Identification, animal feces/human feces

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. P. Seyfried, University of Toronto

LIAISON OFFICER
OR SUPERVISOR

Michael Young

RESEARCH
CATEGORY:

INTERNAL —
GRANT —

UNSOLICITED CONTRACT —
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —
CONCURRENT PROJECT —

OBJECTIVE: (1) To provide information essential to the development of two new methods, mTEC_{IG} for E. coli and mE for Enterococci, which are specific indicators of ^{IG} fecal pollution, and

(2) By identifying the genus and species of the bacteria being enumerated, establish the ability of the newer tests to differentiate between human and non-human fecal sources either on their own or in combination with other established parameters.

DESCRIPTION: Water samples will be analyzed for Fecal coliforms (mTEC), E. coli (mTEC_{IG}), Fecal streptococci (mEnterococcus), Enterococci (mE) and Pseudomonas aeruginosa (mPA). Bacteria for identification will be picked from mTEC and mTEC_{IG}, mEnterococcus, and mE agars. A detailed picture of the Fecal coliform and Streptococcus populations will be provided that can be used to evaluate the specificity of mTEC_{IG} and mE to recover E. coli and Enterococci respectively and by the ^{IG} types of species present, determine the sources of pollution. Plates will be chosen with a count of approximately 20-100, divided into segments and all colonies in a segment picked (minimum 8, maximum 15). Recognized micro identification procedures such as API 20E and API 20 S will be used in combination with standard laboratory tests where necessary. Bacteria will be identified to species level.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Aug. 31/84</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
	23,200	23,200		1	1
SOURCE OF FUNDS:	REGULAR WORK — PROGRAM	SPECIAL MINISTRY <u>X</u> FUNDING		JOINTLY FUNDED — PROJECT	OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: August 5, 1983

PROJECT TITLE: Comparison of the Ames test and Replicative Killing Assay as Detectors of Mutagenicity in Chemical Compounds and Environmental Samples

KEY WORDS: Mutagenicity, Ames test, Replicative Killing assay, Organic Compounds Environmental Concentrates

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. D. Logan
York University

LIAISON OFFICER OR SUPERVISOR Dr. D.A. Rokosh

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT X MULTI-YEAR PROJECT ———
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To evaluate the Replicative Killing assay as an adjunct to the Ames test for mutagenic activity.
To compare the specificities and sensitivities of the Replicative Killing Assay and Ames test on mutagenic standard compounds and concentrated ground water samples

DESCRIPTION: Preliminary Studies on the MOE Biohazards laboratory on the Replicative Killing (RK) Assay as a screen for mutagenic activity have been encouraging. The RK assay will be further evaluated by comparing the sensisity and specificity on 15 model compounds with that of the Ames test.

Both methods will be further evaluated for their ability to detect mutagenicity in concentrated samples of groundwater.

Standard compounds and Concentrated samples will be selected and supplied by the Biohazard Laboratory of the Ministry of the Environment.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1983</u> YEAR	REPORTING DATE	<u>August 31, 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	13000	13000	0.6	0.6	
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ———	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	No				
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: May, 1983

PROJECT TITLE: Epidemiological Study of Disease Incidence and Recreational Water Quality at Selected Conservation Areas in Southern Ontario.

KEY WORDS: Epidemiology, Recreational Water Quality, Viruses, Standards

PRINCIPLE INVESTIGATOR AND AFFILIATION Professor P.L. Seyfried, University of Toronto

LIAISON OFFICER OR SUPERVISOR G. Jenkins

RESEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT X SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

- 1) To investigate the relationship between recreational water quality and disease incidence at selected conservation sites and to perform risk assessment analyses on the accumulated data.
- 2) To develop suitable methods for the recovery, enumeration and identification of Campylobacter jejuni and Giardia from environmental samples.
- 3) To refine methods for virus isolation and identification from environmental samples.

DESCRIPTION:

Selected conservation areas will be monitored for bacteria and viruses during the summer of 1983. An epidemiological survey of the swimmers and non-swimmers at the sites will be conducted concurrently.

Techniques for detecting Legionella, Campylobacter jejuni, Giardia and enteric viruses in recreational waters will be investigated. Viruses will be identified by serological and electron microscopic methods.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>April 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	149,000	114,280	7	5	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	<u>X</u>	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS: The results of the study will provide valuable information for the assessment of recreational water quality standards.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research

DATE: October, 1982

PROJECT TITLE: Development of a methodology for the concentration and detection of rotaviruses and Hepatitis A virus in environmental samples

KEY WORDS:

Rotavirus, hepatitis A virus, Norwalk agent, Environment, methodology

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Professor Frances W. Doane, University of Toronto

LIAISON OFFICER

OR SUPERVISOR

G. Jenkins

RESEARCH

CATEGORY:

INTERNAL —

GRANT ☒

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE: To develop methods for determining the incidence of pathogenic viruses in sewage effluent and in associated surface waters, particularly with respect to rotaviruses, Norwalk agent and hepatitis A virus.

DESCRIPTION:

Immunolectron microscopy, radioimmunoassay, and enzyme immunoassay will be evaluated for their sensitivity and specificity in detecting viruses in environmental samples. A methodology for rotavirus detection will be developed first, and similar techniques will be investigated and applied to Norwalk agent and hepatitis A methods if feasible.

DURATION
OF PROJECT

2 YEARS

PRESENT
YEAR IS

and YEAR

REPORTING
DATE

April 1984

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

49,000

00

2

2

SOURCE OF
FUNDS:

REGULAR

SPECIAL

JOINTLY

WORK —

MINISTRY —

FUNDED —

OTHER —

PROGRAM

FUNDING

PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: August 23, 1983

PROJECT TITLE: WQS 8301

Automated Ion Chromatographic System For the Determination Of Sulphate

KEY WORDS:

Ion Chromatography, Automation, Sulphate

PRINCIPLE INVESTIGATOR

AND AFFILIATION

J. Crowther

LIAISON OFFICER

OR SUPERVISOR

S. Villard

RESEARCH

CATEGORY: Regular

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

X

OBJECTIVE:

To construct an ion chromatographic system which permits automated determination of sulphate and which is compatible with Direct Computer Input to LIS-as envisioned at this time.

DESCRIPTION:

The analytical modules will consist of a Gilson sampler, eluent pump, line filter, pre-column, analytical column, 6-port valve plus driver, timer and conductivity detector. The analytical columns will be Westcan (silicate packing). If successfully developed, the resulting IC system should operate at pH 4, and hence be less susceptible to fouling by fulvates, humates etc. The expected time of analyses is 2 - 4 min. per sample, or double the current analytical rate. As no suppressor columns would be required, the system can be operated by a timer-interface. DCI will require a micro computer, however.

DURATION
OF PROJECT

1

YEARS

PRESENT

YEAR IS

YEAR

REPORTING
DATE

1984

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

13,000

CURRENT YEAR

10,000

MAN YEARS

TOTAL PROJECT

0.4

CURRENT YEAR

0.3

SOURCE OF
FUNDS:

REGULAR

WORK

PROGRAM

X

SPECIAL

MINISTRY

FUNDING

JOINTLY

FUNDED

PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

Experimental work completed - report in preparation.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: August 24, 1983

PROJECT TITLE: WQS 8302
FLOW INJECTION ANALYSIS FOR ATOMIC ABSORPTION

KEY WORDS: Flow Injection Analysis, Atomic Absorption Analysis

PRINCIPLE INVESTIGATOR
AND AFFILIATION Walter M. Wright

LIAISON OFFICER
OR SUPERVISOR Joan Crowther

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE: To increase the stability, repeatability and sampling rate of a dual atomic absorption system with subsequent computerized data capture and reporting.

DESCRIPTION: The use of a Valco injection valve to introduce the sample to two Varian atomic absorption units is to be automated by building a clock interface to perform all of the necessary operations. This interface will control the valve, sampler and initialization of the integration period of the instruments. The resulting data from the instruments will be captured by a minicomputer and processed to yield final results which can then be transferred to the Laboratory Information System.

DURATION OF PROJECT 2/3 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE April 1, 1984

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	13,000	8,000	0.5	0.3
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? YES

PARTICIPATION BY OTHER MINISTRIES: NO

REMARKS: Report to be issued on completion of project as well as complete documentation of software.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: September 23/83

PROJECT TITLE:

Determination of Sulphide in Effluents by Differential Pulse Cathodic Stripping Voltammetry (DPCSV)

KEY WORDS:

Sulphide, Effluents, Cathodic Stripping Voltammetry

PRINCIPLE INVESTIGATOR

AND AFFILIATION

R.S. Sadana

RS 8301

LIAISON OFFICER

OR SUPERVISOR

J.N. Bishop

RESEARCH

CATEGORY:

INTERNAL ☒

GRANT ☐

UNSOLICITED CONTRACT ☐

SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐

CONCURRENT PROJECT ☐

OBJECTIVE:

To develop an analytical method for the determination of sulphide in effluents.

DESCRIPTION:

Sulphide concentration as low as 2 ug/l is reportedly toxic to the fish and aquatic life. The Laboratory Services Branch does not have a sensitive and selective method for this parameter. This analyte is perishable and therefore a better preservation method is needed.

A literature review of existing methodologies will be followed by the development of a sensitive DPCSV method to meet the analytical needs of the Ministry. A sample preservation technique will also be developed. The accuracy, precision and interference study will be carried out.

DURATION OF PROJECT	<u>1/2</u> YEARS	PRESENT YEAR IS	_____ YEAR	REPORTING DATE	<u>April, 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$12,000.	\$6,000.	<u>1/2</u>	<u>1/4</u>	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED? YES					
PARTICIPATION BY OTHER MINISTRIES: NONE					

REMARKS:



Ontario

Ministry
of the
Environment

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RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research Branch

DATE: September 8, 1983

PROJECT TITLE:

Determination of fluoride in vegetation by Ion Selective Electrode method after extraction with dilute perchloric acid.

KEY WORDS:

Fluoride; Ion Selective Electrode; Vegetation, perchloric acid extraction

PRINCIPLE INVESTIGATOR

AND AFFILIATION

P.N. Vijan - I.T.C.

LIAISON OFFICER

OR SUPERVISOR

J.N. Bishop

RESEARCH

CATEGORY:

INTERNAL X
GRANT —UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To achieve rapid determination of fluoride in ground vegetation by simple extraction with dilute perchloric acid and direct measurement in the slurry with the fluoride ion electrode.

DESCRIPTION: Weigh 0.5 to 1.0 gram sample in screw cap plastic test tube calibrated at 50 ml. Add 25 ml 0.1N perchloric acid and shake for one-half or one hour. Add 25 ml of 0.1N perchloric acid and stir with a magnetic stirrer. Introduce the fluoride ion electrode in the slurry and read the concentration fluoride.

Study the effects of temperature, shaking time, conc. of perchloride acid on extractability of fluoride. Test the method against an established method and determine its accuracy and precision.

DURATION OF PROJECT	<u>½ year</u> 1 year	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>May, 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$7,000.	\$4,000.	<u>½ yr.</u>	<u>½ yr.</u>	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED —	OTHER —	
			PROJECT		

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

NO

REMARKS:

There is an urgent need for the method. This work would receive priority over other projects.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: LABORATORY SERVICES & APPLIED RESEARCH BRANCH

DATE: SEPTEMBER 12, 1983

PROJECT TITLE: A comparison of methods for leaching solid industrial waste materials.

KEY WORDS: Solid industrial waste, leach test.

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J.A. Pimenta, Laboratory Services & Applied Research Branch, M.O.E.

LIAISON OFFICER OR SUPERVISOR Mr. J.N. Bishop

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

The transport of soluble hazardous contaminants into ground water systems poses a serious health problem. Several extraction procedures have been proposed to simulate and predict the effect of water on solid industrial waste, before its disposal at a landfill site. The present study will investigate some extraction procedures to determine their effectiveness.

DESCRIPTION:

Several industrial waste materials, such as foundry sand, fly ash, slag will be treated with distilled water using various agitation procedures. The extracts will be analysed for metals listed in Schedule 5 of the Waste Management Branch's "Interim Guideline for the Interpretation of the Hazardous Waste Definition (Regulation 308).

DURATION OF PROJECT	<u>25</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	<u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$4,000.	\$4,000.	0.25	0.25	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK PROGRAM	SPECIAL <input type="checkbox"/> MINISTRY FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? ☒ Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE:

A NOVEL FIELD SAMPLER FOR ATMOSPHERIC POLLUTANTS

KEY WORDS: dew point, artefact, atmospheric pollutants, field sampler

PRINCIPLE INVESTIGATOR AND AFFILIATION O. W. Berg, Organic Characterization Section

LIAISON OFFICER OR SUPERVISOR Dr. O. Meresz

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop an atmospheric sampler which does not depend on impingers and adsorbents for the concentration of atmospheric pollutants.

DESCRIPTION:

Atmospheric pollutants are usually present at high dilution and, for analytical purposes, it is normally necessary to concentrate them to a high degree. There is a great danger that during the conventional techniques artefacts are introduced.

According to the concepts developed by Dr. Meresz, it is proposed that the atmospheric samples are cooled below their dew points. In this case, the condensing water vapours will entrap the pollutants, and the condensates can be analysed by conventional means.

DURATION OF PROJECT	0.3 YEARS	PRESENT YEAR IS	1 YEAR	REPORTING DATE	uncertain
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$2,000		0.2		
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

Yes. Internal followed by publication.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

The exploratory experiments have started, and the initial experimental work has been promising. The project is currently on hold.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE: DEVELOPMENT OF NOVEL TECHNIQUES FOR THE QUANTITATIVE RECOVERY OF PRIORITY POLLUTANTS FROM SOLVENT EXTRACTS.

KEY WORDS: priority pollutants, recovery, solvent, extracts

PRINCIPLE INVESTIGATOR
AND AFFILIATION O. W. Berg, Organic Characterization Section

LIAISON OFFICER
OR SUPERVISOR Dr. O. Meresz

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop novel techniques to prevent losses of medium-volatile organics from solvent extracts during the removal of excess of solvent.

DESCRIPTION:

Based on classical physical chemistry concepts of equilibria in solvent-solute systems, low varieties of diffusion cells will be constructed and tested for the concentration of the solvent extracts. A concentration factor of about 100 will be considered.

1. Thermal Diffusion

A "hot-cold wall" cell will be constructed and tested. The solvent vapour will diffuse against a cold surface, (cooled electrically by the Peltier effect) where it will condense. It is removed from the diffusion cell by gravity.

2. Air-Flow Cell

A solvent removal cell will be constructed in such a manner that a stream of nitrogen, under pseudo-equilibrium conditions, will remove the solvent vapours thus concentrating the extract.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>uncertain</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$4,000	\$4,000		0.4	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u> </u> PROJECT	OTHER <u> </u>	

IS A REPORT ANTICIPATED? Internal report.

PARTICIPATION BY OTHER MINISTRIES:
No.

REMARKS:

July 23, 9812. The two cells described above have been designed and analytical tests are in progress. The project is currently on hold.



BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE: DESIGN OF A CONTINUOUS PURGING APPARATUS FOR THE CONCENTRATION OF MAL-ODOROUS ORGANICS IN WATER

KEY WORDS: purging, apparatus, organics, water, adsorbent

PRINCIPLE INVESTIGATOR AND AFFILIATION O. W. Berg, Organic Characterization Section

LIAISON OFFICER OR SUPERVISOR Dr. O. Meresz

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop a rugged field apparatus for the continuous trapping of volatile organic substances causing odour problems in potable water.

DESCRIPTION:

The projects involves the design and testing of an apparatus based on the concepts developed by Dr. Meresz. It involves the use of air for the continuous purging of water running through the device. The airstream is purified with a charcoal filter, and the odorous components are trapped on a solid adsorbent. In subsequent laboratory work, the organics are removed from the solid adsorbent by thermal desorption or by solvent extraction for characterization and identification.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	May 1984
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$3,000	\$1,500	0.6	0.3	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL <input type="checkbox"/> MINISTRY <input type="checkbox"/> FUNDING	JOINTLY <input type="checkbox"/> FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

Internal followed by publication of results. Ryerson thesis.

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

July 23, 1982. The apparatus has been designed, and the hydraulic stream have been adjusted. Chemical trials with model compounds such as peppermint oil are in progress. An interim report is available in the form of a Ryerson thesis. Development of A Continuous Purger System for the Concentration of Taste and Odour Causing Organics in Drinking Water, Kevin D. McCrimmon, Ryerson Polytechnical Institute.



BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE:

AUTOMATED EXTRACTION OF WATER SAMPLES FOR THE ANALYSIS OF
PRIORITY POLLUTANTS

KEY WORDS:

automation, extraction, water, priority pollutants

PRINCIPLE INVESTIGATOR
AND AFFILIATION

O. W. Berg, Organic Characterization Section

LIAISON OFFICER
OR SUPERVISOR

Dr. O. Meresz

RESEARCH
CATEGORY:

INTERNAL ☒
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop an automated procedure for extraction of priority from water samples
in order to free staff in critical areas of the section.

DESCRIPTION:

This project is the 2nd phase of a project entitled, "Automated Extraction of Water for
Analysis of Organochlorine Pesticides and Polychlorinated Biphenyls". This 1st phase was
successfully concluded in 1981 in the Pesticides Section and reported on at the Pittsburg
conference in 1981. In order to adopt the extractor to the priority pollutant analysis, the
following areas will be explored:

1. Electrical Design

In order to make the termination and other variables of the timing cycle independent of
the operator's judgement, electronic sensors will be developed. Both conductive and
capacitive sensors will be designed and tested.

2. Hydraulic System

The system will be optimized for the extraction of organics with considerably less
favourable partition coefficients than those of the organochlorine pesticides and PCB's.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>uncertain</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$4,000	800		0.8	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

Yes. Internal report.

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

Due to shift in priorities, the project is currently on hold.



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RESEARCH AND DEVELOPMENT INVENTORY

LS-78

BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE:

THE USE OF THE KENICS MIXER IN FAST ANALYTICAL EXTRACTIONS

KEY WORDS:

extraction, organics, Kenics mixer

PRINCIPLE INVESTIGATOR
AND AFFILIATION

O. W. Berg, Organic Characterization Section

LIAISON OFFICER
OR SUPERVISOR

Dr. O. Meresz

RESEARCH
CATEGORY:INTERNAL X
GRANT —UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To develop a fast and efficient extractor which is less labour intensive than those based on the standard separatory funnels.

DESCRIPTION:

The Kenics mixer is widely used in the chemical industry for mixing/blending purposes. The model 316, 3/16 x 10" is used in this study. The project consists of two main parts:

1. Design and Construction of the Contactor

The main principle in the design of the contactor involves the use of compressed air to move both the solvent and the sample. The contactor is mounted on a console, and the operator involvement is confined to the attachment of the sample bottle to an adapter and opening a valve.

2. Design of Fast Phase Separator

A variety of phase separator designs will be considered. The static type will be investigated first. These types will involve the coagulation of the two-phase system on Teflon shavings, and in cyclone-type separators.

DURATION
OF PROJECT

On-going YEARS

PRESENT
YEAR IS3 YEARREPORTING
DATE1985

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$7,500

\$2,500

1

1

SOURCE OF
FUNDS:REGULAR X
WORK —
PROGRAMSPECIAL
MINISTRY —
FUNDINGJOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Internal

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

July 23, 1982. The contactor has been designed and built. The first attempts to design a fast, static phase separator have failed. Due to lack of manpower, the project is currently on hold.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE: A NOVEL EXTRACTION TECHNIQUE FOR PRIORITY POLLUTANTS UTILIZING
VERY SMALL QUANTITIES OF SOLVENTS

KEY WORDS: extraction, priority pollutants

PRINCIPLE INVESTIGATOR
AND AFFILIATION O. W. Berg, Organic Characterization Section

LIAISON OFFICER
OR SUPERVISOR Dr. O. Meresz

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop efficient extraction techniques for the determination of organic micro-pollutants.

DESCRIPTION:

The work-up of the solvent extract would be easier if the extracts were small in volume. This can be accomplished with solvents lighter than water and with the following extractor. A one-litre Teflon bottle is etched internally with an active sodium compound in order to make it hydrophilic. It is equipped with a special screw-on adapter consisting of a Teflon screw cap and 5 x 60 mm glass tube. After thorough shaking of the sample with solvent, the adapter is attached to the bottle, and the bottle is squeezed. The extract then flows into the adapter where it can be removed from with a syringe.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>uncertain</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT \$2,500	CURRENT YEAR \$1,000		TOTAL PROJECT	CURRENT YEAR 0.5
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING		JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Yes. Internal

PARTICIPATION BY OTHER MINISTRIES:

No.

REMARKS:

The initial experimental work has been successful. Due to organizational changes, the investigative work is continued by Dr. D. Hall.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Laboratory Services & Applied Research

DATE: November 1983

PROJECT TITLE: CONCENTRATION OF ORGANIC POLLUTANTS FOR MUTAGENICITY
TESTING MACRORETICULAR RESIN TECHNIQUES

KEY WORDS: extraction, concentration, XAD resins, resin columns, organic pollutants

PRINCIPLE INVESTIGATOR
AND AFFILIATION O. W. Berg, Organic Characterization Section

LIAISON OFFICER
OR SUPERVISOR Dr. O. Meresz

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To develop efficient isolation techniques for mutagenicity testing of organic micro-pollutants

DESCRIPTION:

Mutagenicity testing of potentially hazardous organics in water require relatively large quantities of the organic materials. Due to the very low concentrations of these organics in the aqueous phase, very large volumes, 50-100 litres of samples would have to be handled. The classical approach of using solvent extractions is impractical with these large sample volumes. The use of resin accumulator columns has become a useful technique in this context. However, so far a more systematic approach in addressing the potential shortcomings of this method, collection efficiencies and stripping efficiencies, have not been investigated in any great detail. This is the intent of this project. The investigation will involve the design of efficient column hardware, and the rigorous testing of the adsorbents with the organics on the priority pollutants list.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>1985</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$4,000		0.5		
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes. Ryerson thesis in 1984.				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

The introductory parts of this project are handled by a 4th year student of the Ryerson Polytechnical Institute as his thesis topic.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Laboratory Services & Applied Research Branch

DATE: December/83

PROJECT TITLE: Sampling Methods for Dioxins

KEY WORDS: Dioxins, Sampling, Drinking Water, Raw Water, Sludge

PRINCIPLE INVESTIGATOR
AND AFFILIATION R. Hunsinger

LIAISON OFFICER
OR SUPERVISOR K. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a standardized sampling protocol for the sampling of dioxins in raw water, potable water and sludge.

DESCRIPTION:

DURATION PROJECT	<u>1.0</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>April/84</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	35K	35K	0.2	0.2	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input checked="" type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

\$ included contract staff

V. PESTICIDES RESEARCH

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-01

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE:

The efficacy of insecticidal baits in the control of the
Carpenter Ant, *Camponotus* spp.

KEY WORDS:

Insecticidal baits Carpenter Ant

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. W. D. Blaine Chemical Research International

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the efficacy of insecticidal bait in the control of
carpenter ant.

DESCRIPTION:

A critical assessment of several new insecticides will be carried out to find
if they are suitable candidates for use in baits for control of the carpenter ant.

Following this test, those insecticides that showed the most potential would
be tested under field conditions. This would be done by treating infestations and then
carrying out follow-up surveys and inspections. Each infestation would be rated and a
comparison would be made with the normal chlordane control method.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$10,000	\$5000			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Integrated management of turfgrass disease in Ontario

KEY WORDS:

Integrated management

Turf disease

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Dr. L. L. Burpee, Department of Environmental Biology, U-of-Guelph

LIAISON OFFICER

OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH

CATEGORY:

INTERNAL —

GRANT X

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE: To determine if specific cultural practices (i.e. physical and chemical thatch modification and quantitative changes in nitrogen fertilization) may provide acceptable control of turfgrass pathogens alone, or in combination with reduced dosages of fungicides and/or reduced numbers of fungicide applications.

DESCRIPTION:

Pink and grey snow molds are among the principal diseases affecting turfgrasses in Ontario. Since the early 1930s, turf managers have controlled these diseases by applying fungicides in late autumn, prior to the first snow fall.

A reduction in fungicide application rates for snow mold control may be achieved through an integrated management scheme. Such a scheme would incorporate cultural as well as chemical methods in an attempt to obtain effective control with less fungicide.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>					
BUDGET:	TOTAL DOLLARS		MAN YEARS							
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR						
	\$16,000	\$8,000								
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —						
IS A REPORT ANTICIPATED?	Yes									
PARTICIPATION BY OTHER MINISTRIES:										
REMARKS:										

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-03

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Behaviour of disulfoton (Disyston^(R)) in soil.

KEY WORDS:

Insecticide Disulfoton Persistence Soil Water

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. R. A. Chapman - University of Western Ontario

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To examine the persistence, degradation, and mobility of disulfoton in soil and its persistence and degradation in water. Soil studies will be done in microplots using a light mineral soil.

DESCRIPTION:

As in previous work with aldicarb, tests will be done under normal and simulated (minimum, excessive) rainfall conditions. The granular insecticide will be applied as a broadcast application to one set of plots maintained under normal conditions to obtain basic information on persistence and degradation, and as the recommended seed furrow application under the normal and simulated rainfall conditions. No crops will be grown in these plots. However, an additional set of untreated and treated plots will be established in which the occurrence of the insecticide residues in the seed furrow, seed piece, foliage, and harvested potatoes will be monitored. Insecticide mobility in soil and persistence in water will be studied in the laboratory. If possible, mobility of disulfoton in soil also will be studied under field conditions.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$10,000	\$10,000			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED —	OTHER —	
			PROJECT		
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-04

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Persistence and degradation in soil of insecticides recommended in Ontario for corn rootworm control.

KEY WORDS: Insecticides Persistence Soil

PRINCIPLE INVESTIGATOR Dr. R. A. Chapman
AND AFFILIATION Dr. D. G. R. McLeod - University of Western Ontario

LIAISON OFFICER
OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To obtain comparative persistence data on insecticides recommended for rootworm control.

DESCRIPTION:

Tests will be done on microplots, using a pesticide residue-free soil of a type suitable for corn production. Formulated insecticides will be applied as banded applications in the recommended manner and other agricultural practices will be followed. Pre-treatment soil samples will be taken; subsequent post-treatment soil samples will be taken at frequent intervals over the first two months of the application, less frequently during the latter part of summer and fall, and in the spring of the following year. The soil samples will be analyzed for residues of the parent materials and insecticidal metabolites.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$29,000	\$14,900			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					
REMARKS:					

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-05

BRANCH: PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: Persistence of thiocarbamate herbicides in soils with and without a history of continuous applications.

KEY WORDS: Thiocarbamate, herbicides, Persistence Soils

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. J. Dekker
Dept. of Crop Science, University of Guelph

LIAISON OFFICER OR SUPERVISOR: Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL — GRANT ☒ UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: 1) To develop an accurate, rapid and efficient bioassay technique to evaluate whether the phenomenon of "soil conditioning" with butylate and its extender exists. 2) To document the histories of all grower fields reporting similar problems in Ontario. 3) To test all samples again by means of soil extraction and analysis with gas-liquid chromatography to determine and confirm the time of herbicide dissipation from the soil.

DESCRIPTION:

The nature of this project is in many respects exploratory by necessity. A problem exists and the apparent solutions may imply deleterious environmental consequences. There is a need to develop a good technique to rapidly evaluate the problem, and then to commence developing an empirical data base from which more mechanistic experimentation can be directed. Once the environmental impact information has been developed the best recommendations for growers can be made.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	<u>> \$10,000</u>	<u>\$10,000</u>			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-06

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: The effect of intensity, frequency and amount of rainfall on the movement, persistence, biological availability and activity of metalaxyl, chlorpyrifos and diphenamid.

KEY WORDS: Pesticides Soil applied Persistence Rainfall

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. L. V. Edgington
Dept. of Environmental Biology, University of Guelph

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL — GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

- OBJECTIVE: 1) To determine the leachability, upward movement and dissipation of pesticides in soil planted with or without crops.
2) To determine the effects of various levels of rainfall or irrigation water on the distribution of pesticides in soil and their availability to the target organisms.
3) To determine the rate of degradation of pesticides at various soil depths.

DESCRIPTION:

Three soil-applied pesticides, metalaxyl, chlorpyrifos and diphenamid will be used for this investigation. These chemicals are currently used for the control of tobacco pests. The water solubility of chlorpyrifos, diphenamid and metalaxyl are 2,260 and 7100 ppm, respectively. This investigation will demonstrate the distribution of chemicals of various water solubilities when subjected to various amounts and frequencies of rainfall or irrigation. These chemicals will be applied simultaneously to the soil.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$8,800	\$8,800			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-07

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Determination of the cause of poor efficacy of insecticides used for control of rootworms.

KEY WORDS:

Insecticides Poor efficacy Causes

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. C. R. Ellis
Dept. of Environmental Biology, University of Guelph

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

Research Plans for 1983 (By Objective):

1. A research priority for 1983 is obtaining one more year's data on efficacy of various application methods. This research will be done as in 1981 and 1982. One experiment will be established using the precision applicator and three will be done using the farmer's equipment. The survey last year showed, for instance, that only 25% of rootworm insecticides were incorporated although incorporation was recommended in OMAF publications. If we are to change grower action, we will need definitive data. Three years of data should be adequate.
2. The farm survey was initiated in 1982 and provided much needed data. This objective will be pursued in 1983 in two ways.
 - a) There will be a follow-up survey of the participants of the original survey. Objectives will be to i) relate grower perception of control with my predictions based on observations at application time, ii) extended the data base by additional survey questions relating to cleaning and maintenance of equipment.
 - b) An additional survey will be done to extend the data base by adding additional farmers from more areas of Ontario.
3. No screening for resistance is planned.
4. The only way that data on efficacy of various banded treatments can be interpreted logically is from knowing the distribution of the target rootworms. Now that separating 1st-instar larvae of the two species looks possible by electrophoresis, we will go on to study the distribution of the two species in relation to corn plants and banded treatments. A series of experiments are planned for 1983 using artificial infestations under controlled conditions. We expect this part of the project to be completed in 1983.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$38,100	\$15,300			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-08

BRANCH:

PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE:

Feasibility of using the egg parasite, Trichogramma minutum Riley, for the Spruce Budworm, Choristoneura fumiferana (Clemens).

KEY WORDS:

Biological control Spruce budworm Egg parasite

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. M. Hubbes
Faculty of Forestry, University of Toronto

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT X

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

1. To evaluate the feasibility of using inundative releases of T. minutum for the control of the spruce budworm.
2. To investigate the effects of different environmental and release conditions on levels of parasitism by T. minutum.
3. To characterize strains of T. minutum and determine the one best suited for inundative release.
4. To establish guidelines of quality control for the mass production of T. minutum.

DESCRIPTION: Field trials will be conducted on Crown land at Hearst. Mass-rearing and release of the parasites will be carried out through the cooperation of the Biocontrol Centre at Guelph and the Ministry of Natural Resources. Laboratory space is available at the University of Toronto, Faculty of forestry and weather monitoring equipment from Atmospheric Environment. Cooperation with the Great Lakes Forest Research Centre for the production of spruce budworm egg masses is assured.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$27,760	\$13,500			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	MNR				
REMARKS:					

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-09

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: "Monitoring the economically important pest variegated cutworm (*Peridroma saucia* Hbn) in tomatoes, Kent and Essex Counties, to reduce insecticide usage.

KEY WORDS: Variegated cutworm Tomatoes Pesticide Use.

PRINCIPLE INVESTIGATOR
AND AFFILIATION Mr. H. J. Leili
Agricultural Research Department, H. J. Heinz Co. of Canada

LIAISON OFFICER
OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT SOLICITED CONTRACT MULTI-YEAR PROJECT CONCURRENT PROJECT

OBJECTIVE:

1. To correlate pheromone trap catches of adult male Variegated Cutworm moths with subsequent field populations of larvae and resulting fruit damage.
2. To establish an economic damage threshold, which economically justifies the application of an insecticide load on the tomato crop.
3. Continue developing and refining pheromone monitoring techniques for the Variegated Cutworm.

DESCRIPTION:

Monitor Variegated Cutworm populations by means of pheromone traps, at 10 to 12 grower locations, throughout Essec and Kent Counties. Moth counts will be taken twice per week, beginning early in June. At each grower location, small non-spray check areas will be replicated in order to estimate actual larval populations. Detailed field checks for larvae will be carried out when it is found necessary to do so through degree-day-accumulation after peak moth flight activity. Fruit damage counts will be taken at all locations in the non-sprayed check areas. Tests will be conducted to determine the most effective commercial insecticide for the control of Variegated Cutworm larvae. Monitoring techniques will continue to be refined in 1983 in order to minimize the efficiency of pheromone monitoring.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$9,000	\$5,500			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY <u> </u> FUNDING	JOINTLY FUNDED <u> </u> PROJECT	OTHER <u> </u>	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Efficacy of alternative herbicides to Allidochlor
in onions.

KEY WORDS: Onions Muck soils Herbicides

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. V. S. Machado
Dept. of Horticultural Science, University of Guelph

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

1. Produce efficacy data to support registration of alternative herbicides in onions on muck soils.
2. Evaluate the efficacy of combinations of broadleaf weed herbicides in sequence, as related to the onion seedling developmental stages of growth, at various levels of each herbicide and in repeat applications. Emphasis will be placed on broadleaf weed control and crop phytotoxicity from the 'loop' to the 3-leaf stage.

DESCRIPTION:

Field trials at Bradford (Muck Research Station)

1. (a) Testing the following broadleaf weed herbicides in sequence.
Pre-emergence: Paraquat followed by Pyrazone
Post-emergence: Loop stage (Cyanazine or CIPC), 2-leaf (Oxyfluorfen), 3-leaf (Ioxynil).
- (b) Several rates of the above herbicides and repeat applications after the 2-leaf stage, testing Oxyfluorfen and Toxynil to provide prolonged weed control of late emerging weeds.
2. Evaluate the following grass weed herbicides, Dichlofop-methyl, Poast and Fluazifop on onions.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT \$13,000	CURRENT YEAR \$7,000	TOTAL PROJECT	CURRENT YEAR	
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK <input type="checkbox"/> PROGRAM	SPECIAL <input type="checkbox"/> MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-11

BRANCH: PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: Influence of environmental factors on the rate of microbial degradation of pesticides in soil.

KEY WORDS: Pesticides Microbial degradation Soil Water

PRINCIPLE INVESTIGATOR Dr. C. M. Tu
AND AFFILIATION Mr. J. R. W. Miles - University of Western Ontario

LIAISON OFFICER
OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: In 1983, we propose to investigate the effect of soil pH on the rate of microbial degradation of insecticides in soil. The technique will be similar to that used successfully in the earlier temperature and moisture studies. Tests will be done using a representative mineral soil, and three pH levels (acid, neutral, alkaline) under sterile and non-sterile conditions. Several insecticides will be included. The soils will be incubated for 24 wks, with samples being analyzed at appropriate intervals for residues of the insecticides or their metabolites and for microbial populations.

DESCRIPTION:

It is well known that pH influences the persistence of pesticides in water and it has often been suggested that pH will influence pesticide persistence in soil. There is, however, little solid research data to support this hypothesis. In fact, recent work (Chapman and Cole, 1982, J. Environ. Sci. Health B17: 487-504) indicates that chemical hydrolysis of some insecticides in soil is not affected by pH. The authors suggest that, if soil pH does affect insecticide persistence in soil, it may be due to the fact that microbial degradation is pH dependent.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$26,400	\$10,000			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-12

BRANCH: PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Toxicological implications of Bacillus thuringiensis
var israelensis.

KEY WORDS: Bacillus thuringiensis Toxicology Mosquitoes

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. K. H. Rothfels
Department of Botany, University of Toronto

LIAISON OFFICER OR SUPERVISOR: Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To determine the toxicological implications of Bacillus thuringiensis var israelensis with respect to mosquito and black fly predators.

DESCRIPTION:

Test a number of mosquito and black fly predators with activated B.t.i. toxin and with treated prey.

LD50's and LD90's will be calculated for the two sibling species of S. vittatum as well as for number of other black fly species.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	Progress Report
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$4,700	\$4,700			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <u>X</u>	SPECIAL MINISTRY FUNDING —	JOINTLY FUNDED PROJECT —	OTHER —	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-13

BRANCH: PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: Development of sex attractant traps for monitoring changes in low density spruce budworm populations as a means of implementing early intervention management strategies.

KEY WORDS: Spruce budworm Populations Sex attractant traps

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. C. J. Sanders
Dept. of Biology, The Sault College of Applied Arts & Technology

LIAISON OFFICER OR SUPERVISOR: Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop sex attractant traps for monitoring changes in low density spruce budworm populations.

DESCRIPTION:

1983

- i. trap/larvae correlations
- ii. evaluating lures
- iii. determining trap efficiency
- iv. identification of confusing Lepidoptera
- v. publish results

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>4</u> YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$47,750	\$12,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-14

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Dislodgeable pesticide residues on turfgrass in relation to safe entry.

KEY WORDS:

Pesticide residues Turfgrass Re-entry

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. M. K. Sears
Dr. G. R. Stephenson - Dept. of Environ. Biology, U-of-Guelph

LIAISON OFFICER OR SUPERVISOR: Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

1. To compare the persistence of dislodgeable residues of 2,4-D and diazinon following application to turf grass as granular formulations with fertilizers and as sprays.
2. To study the influence of shade on the disappearance of dislodgeable residues of 2,4-D and diazinon.
3. To examine the persistence of dislodgeable residues with a more persistent turf herbicide (dicamba) and a more persistent turf insecticide (chlorpyrifos)

DESCRIPTION:

During recent years there has been considerable controversy and debate over the use of pesticides in public areas. This has been particularly true for the use of 2,4-D and related herbicides for weed control in school yards, parks, playing fields, as well as on roadsides and powerlines.

Many people wish to be informed if there is any chance that they or their children could be exposed to significant levels of a recently applied pesticide in a public area. Little information is available on the persistence of dislodgeable residues of herbicides or of moderately toxic insecticides used on recreational areas.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	Progress Report
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$64,500	\$30,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes - Data for 2 years received.				
PARTICIPATION BY OTHER MINISTRIES:					
REMARKS:					

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-15

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE **DATE:** Nov. 1, 1983

PROJECT TITLE: Meadow mice control in orchards.

KEY WORDS: Meadow mice Control Orchards

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. Z. Siddiqi
Chemical Research International - Toronto

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

- OBJECTIVE:**
1. To demonstrate effectiveness of specially designed bait stations (Radvanyi type) for long term control.
 2. To evaluate effectiveness of new anticoagulant rodenticides.
 3. To evaluate residues toxicity of conventional baits, applied as broadcast fall treatments.

DESCRIPTION:

Same as above.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$50,500	\$20,500			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	<input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/> OTHER <input type="checkbox"/>
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-16

BRANCH:

ONTARIO PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Study of the herbicidal properties and environmental fate of Triclopyr,
(Garlon, Dow Chemicals Ltd.).

KEY WORDS:

Herbicides

Environmental fate

Triclopyr

PRINCIPLE INVESTIGATOR
AND AFFILIATION

Dr. D. W. Smith

Dept. of Botany, University of Guelph

LIAISON OFFICER
OR SUPERVISOR

Pesticides Advisory Committee

RESEARCH
CATEGORY:

INTERNAL —
GRANT —X—

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

- Determine i) the relative mobility and persistence of Triclopyr in soil, in comparison with 2,4-D and Picloram,
ii) the response of both target and non-target plants to Triclopyr under controlled conditions, in comparison with 2,4-D and Picloram, and,
iii) the environmental impact of triclopyr in comparison with 2,4-DP.

DESCRIPTION:

Use of herbicides to control woody vegetation on utility right-of-ways, for example, by the Ontario Hydroelectric Power Commission, has been a widespread management procedure. Recently, some of the more effective chemicals for vegetation control have been removed or restricted in use by governmental control agencies because of their potential environmental or health hazard, e.g. 2,4,5-T or by the user agencies because of their mobility and persistence, e.g. picloram.

A new compound, trichlopyr (Garlon) produced by Dow Chemical Ltd., may be an attractive alternative. Existing information suggests that it may be as effective on target species, (mainly trees), as were those herbicides used previously (2,4,5-T and picloram).

DURATION
OF PROJECT

— 2 — YEARS

PRESENT
YEAR IS

— 2 — YEAR

REPORTING
DATE

Progress Report
Dec. 1983

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF
FUNDS:

\$23,000

\$10,000

REGULAR
WORK —X—
PROGRAM

SPECIAL
MINISTRY —
FUNDING

JOINTLY
FUNDED —
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-17

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: Biological control of the housefly, MUSCA DOMESTICA L., in livestock production facilities.

KEY WORDS: Biological control Housefly Livestock production

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. G. A. Surgeoner
Dept. of Environmental Biology, University of Guelph

LIAISON OFFICER OR SUPERVISOR: Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: The housefly directly affects more producers than any other pest in Ontario. The purpose of study is to evaluate the current status of housefly parasites in Ontario and to devise viable, economic methods for their production and release.

DESCRIPTION: The ultimate objective is to provide Ontario producers with a safe economic method of reducing houseflies while at the same time reducing usage of insecticides.

DURATION OF PROJECT	<u>> 1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	> \$13,500	\$13,500			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <u>X</u>	SPECIAL MINISTRY FUNDING —	JOINTLY FUNDED PROJECT —	OTHER —	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-18

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Field testing models for timing fungicides in onions.

KEY WORDS:

Fungicides Weather timing Onions

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J. C. Sutton - Dept. of Environmental Biology - U-of-Guelph
Dr. T. J. Gillespie- Land Res. Sc.

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To test the microcomputerized weather-monitoring devices for timing fungicides to control Botrytis leaf blight in onions.

DESCRIPTION:

1. To test BOTCAST in the field as a model for predicting moderate and severe risk periods for leaf blight and thus the time when initial fungicide sprays should be applied for that disease.
2. To test DOWNCAST in the field as a model for predicting risk periods for downy mildew.
3. To utilize the Datapods in conjunction with recently developed wetness and temperature sensors as means for monitoring weather in the BOTCAST and DOWNCAST schemes, and to complete refinement of the cylindrical wetness sensor.
4. To complete development of sampling procedures for estimating leaf blight in the field in the period when BOTCAST indicates risk of visible disease.
5. To examine the "sporulation potential" of dead onion leaves at various times in the growing season.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$49,000	\$16,000			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-19

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: Losses in production of processing tomatoes and cabbage attributable to insects, diseases and weeds.

KEY WORDS: Crop losses Insects Diseases Weeds

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J. H. Tolman
Dr. D. G. R. McLeod - University of Western Ontario

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To initiate a study on crop losses caused by pests, in the absence of adequate control measures, to tomatoes and cabbage grown for processing.

DESCRIPTION:

To carry out the study, two 1/2-1 acre parcels of land, suitable for production of the two crops will be rented in the London area. Plots will be established each year and planted with one of the most commonly used varieties of each crop. Pesticides applied will be those recommended for use by growers. Treatments will be applied as follows:

1. No treatment
2. Herbicide + fungicide (crop loss due to insects)
3. Herbicide + insecticide (crop loss due to diseases)
4. Insecticide + fungicide (crop loss due to weeds)
5. Insecticide + fungicide + herbicide.

Each set of treatments will be replicated four times. Observations will be made through the growing season on the incidence and intensity of pest populations. Yields will be taken at harvest and converted to \$ values based on market prices of the crops.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	Progress Report
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	>\$12,500	\$12,500			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	<input checked="" type="checkbox"/>				

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-20

BRANCH:

ONTARIO PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Feasibility of using parasites and predators in a program of integrated control of the onion maggot.

KEY WORDS:

Integrated Pest Management Parasites Onion maggot

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. A. D. Tomlin
Dr. J. H. Tolman - University of Western Ontario, London

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

See below

DESCRIPTION:

- i. To continue to refine the mass rearing technique.
- ii. To conduct further laboratory studies on biology and behaviour, e.g., influence of soil type, compaction, temperature, on parasite efficiency and survival.
- iii. To evaluate the toxicity of formulated pesticides to A. bilineata under laboratory conditions.
- iv. To develop a microplot technique for assessing the effectiveness of the parasite in controlling the onion maggot.
- v. To obtain data on the life history and biology of A. bilineata under field conditions.
- vi. To conduct further field releases at the Thedford Marsh to assess parasite effectiveness under practical conditions.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>4</u> YEAR	REPORTING DATE	Progress Report
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$54,250	\$14,500			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-21

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE **DATE:** Nov. 1, 1983

PROJECT TITLE: To investigate the relationship of spray coverage, biological effectiveness and fruit fungicide residue levels for captan on strawberries.

KEY WORDS: Captan, Strawberries Spray coverage Residues

PRINCIPLE INVESTIGATOR AND AFFILIATION Ontario Fruit and Vegetable Growers Association
Mississauga, Ontario

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To investigate the relationship of spray coverage, biological effectiveness and fruit fungicide residue levels for captan on strawberries.

DESCRIPTION: Captan has long been the mainstay of fruit rot control on strawberries. The recent reduction in allowable residues at harvest from 25 p.p.m. to 5 p.p.m. necessitates serious reconsideration of the disease control program, especially in the light of the high residue levels found in several pick-your-own operations a year ago. An investigation is needed into the factors leading to acceptable residue levels while maintaining adequate disease control. There is insufficient information on sprayer efficiency and the deposition of pesticide droplets from the many types of equipment to formulate recommendations on spray timing and/or rates.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$6,500	\$6,500			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	<input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/> OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 83-22

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: Pesticide Residues in Minor Crops

KEY WORDS: Pesticide residues Minor crops

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. F. L. McEwen
Dept. of Environmental Biology, University of Guelph

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL — GRANT —X— UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

See below

DESCRIPTION:

Each year Ontario producers are faced with pests for which pesticides must be used for control. Pesticide resistance and the withdrawal of a number of pesticides from the market have combined to produce a situation in which pesticides are not available for many small hectareage crops. Registrations for such uses will be obtained only by producing residue data that satisfies the registration authorities in Ottawa that residues are sufficiently low as to present negligible concern. Such residue data will not be developed by the chemical companies since the market potential does not justify the expenditure.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1984</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$17,200	\$17,200			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	<u>X</u>				
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

RESEARCH AND DEVELOPMENT INVENTORY

PAC 82-23

BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE DATE: Nov. 1, 1983

PROJECT TITLE: The in-situ assessment of sublethal effects of the synthetic pyrethroid, fenvalerate on zooplankton.

KEY WORDS: Pyrethroid Fenvalerate Sub-lethal effects Zooplankton

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. N. K. Kaushik
Dept. of Environmental Biology, University of Guelph

LIAISON OFFICER OR SUPERVISOR: Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL X GRANT UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To determine the effects of treatment with sublethal concentrations of fenvalerate on the life history and physiological responses of zooplankton communities under field conditions and to determine indirect effects, if any, of such a treatment.

DESCRIPTION: The synthetic pyrethroids are a group of insecticides characterized by low mammalian toxicity, high insecticidal activity and moderate persistence under field conditions. The application of these insecticides often involves the use of multiple aerial sprays over large areas of land. Contamination of lakes, ponds and streams during spraying or through runoff is inevitable. The synthetic pyrethroids have been shown to be highly toxic to a wide range of fish, aquatic insects, and crustaceans in laboratory toxicity tests. However, field studies on the effects of pyrethroid insecticides on natural aquatic ecosystems are limited but suggest that aquatic invertebrate communities are substantially disrupted when low concentrations of permethrin contaminate aquatic surfaces. As a result, the use of permethrin as an aerial spray has been restricted. Little information is available on the toxicity of the other synthetic pyrethroids such as fenvalerate under field conditions.

DURATION OF PROJECT	<u>2 (?)</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>Progress Report</u> <u>Dec. 1983</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	> \$8,000	\$8,000			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: ONTARIO PESTICIDES ADVISORY COMMITTEE

DATE: Nov. 1, 1983

PROJECT TITLE: Application of epidemiology to reducing fungicide requirements for controlling grey mold of strawberries and brown rot of stone fruits.

KEY WORDS: Fungicides Reduction in use Strawberries Stone fruits

PRINCIPLE INVESTIGATOR AND AFFILIATION Dr. J. C. Sutton
Dept. of Environmental Biology, University of Guelph

LIAISON OFFICER OR SUPERVISOR Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL — GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

1. To examine cultural practices affecting production and survival of inoculum and inoculum sources (sclerotia, conidia etc.).
2. To monitor infection and colonization of strawberry plants by *B. cinerea* in relation to weather factors (crop microclimate).
3. To develop improved schemes for timing fungicide sprays based on weather and crop factors, and to field-test these schemes.

DESCRIPTION:

See above.

DURATION OF PROJECT	3 (?) YEARS	PRESENT YEAR IS	1 YEAR	REPORTING DATE	Progress Report Dec. 1983
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	>\$10,300	\$10,300			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	<u>X</u>				
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					
REMARKS:					

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